HITACHI

No. 0113

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CL28W460N
C28WF560N
CL28WF560N
C32WF560N
CL29F60N

SERVICE MANUAL
MANUEL D'ENTRETIEN
WARTUNGSHANDBUCH

CAUTION:

Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:

Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:

Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

Colour Television

December 2003

TABLE OF CONTENTS

1.INTRODUCTION 1
2.TUNER 1
3.IF PART (TDA9885/86) 1
4.VIDEO SWITCH TEA6415 2
5.MULTI STANDARD SOUND PROCESSOR 2
6.SOUND OUTPUT STAGE WITH TDA7269A 2
7.BERTICAL OUTPUT STAGE WITH STV9379FA 2
8.VIDEO OUTPUT AMPLIFIER TDA6108 2
9.POWER SUPPLY (SMPS) 3
10.MICROCONTROLLER SDA55XX 3
- 10.1.General Features 3
- 10.2.External Crystal and Programmable Clock Speed 3
- 10.3.Microcontroller Features 3
- 10.4.Memory 3
- 10.5.Display Features 3
- 10.6.Acquisition Features 4
- 10.7.Ports 4

11.CLASS AB STEREO HEADPHONE DRIVER TDA1308 4
12.SAW FILTERS 4
13.IC DESCRIPTIONS 5
- 13.1.LM317T 5
  - 13.1.1.Description 5
  - 13.1.2.Features 5
- 13.2.TDA1308T 5
  - 13.2.1.General Description 5
  - 13.2.2.Features 5
  - 13.2.3.Pinning 6
- 13.3.MSP34X0G (MSP3410G) 6
  - 13.3.1.Description 6
  - 13.3.2.Features 7
  - 13.3.3.Pin connections 7
- 13.4.VDP313xY 8
  - 13.4.1.Introduction 8
  - 13.4.2.Features 9
  - 13.4.3.Pin Connections and short descriptions 9
- 13.5.TEA6415C 10
  - 13.5.1.General Description 10
  - 13.5.2.Features 10
  - 13.5.3.Pinning 11
- 13.6.STV9379FA 11
  - 13.6.1.Description 11
  - 13.6.2.Features 11
  - 13.6.3.Pinning 11
- 13.7.TDA7269A 12
  - 13.7.1.Description 12
  - 13.7.2.Features 12
- 13.8.LM7800 (LM7805/LM7808) 12
  - 13.8.1.Description 12
  - 13.8.2.Features 12
- 13.9.AT24C08 12
  - 13.9.1.Description 12
  - 13.9.2.Features 12
  - 13.9.3.Pin Configurations 13

13.10.SDA5555 ... 13
13.10.1.General definition ... 13
13.10.2.Features ... 13
13.11.MC44608 ... 14
13.11.1.Description ... 14
13.11.2.General Features ... 15
13.11.3.Pin Connections ... 15
13.12.TCET1102G ... 16
13.12.1.Description ... 16
13.12.2.Applications ... 16
13.12.3.Features ... 16
13.13.TDA9885T ... 16
13.13.1.General Description ... 16
13.13.2.Features ... 16
13.13.3.Pinning ... 17
13.14.PI5V330 ... 17
13.14.1.General Description ... 17
14. PRODUCTION SERVICE MODE ADJUSTMENTS ... 18
14.1.SERVICE MENU ... 18
14.2.ADJUST MENU ... 18
14.3.OPTIONS MENU ... 30
Option 0. Video Processor Crystal Indication ... 30
Option 1. (0x01) Video Processor Decoder Mode Register ... 30
Option 2. (0x18) Video Processor Blanking Control ... 30
Option 3. (0x19) Video Processor Cathode Drive Level ... 31
Option 4. ... 31
Option 5. CTI Available, Mono AVL ... 31
Option 6. ... 31
Option 7. OPTIONHOTELACTIVE, PLL_VST, PIP Zoom Mode, PIP Position ... 31
Option 8. IF Frequency ... 32
Option 9. Standard Available ... 32
Option 10. Scart, Comb filter, Teletext, Language ... 33
Option 11. PLL Tuner Control 1 Byte ... 33
Option 12. PLL Tuner Control 2 Low Byte ... 33
Option 13. PLL Tuner Control 2 Mid Byte ... 34
Option 14. PLL Tuner Control 2 High Byte ... 34
Option 15. PLL Tuner VHF LOW – VHF HIGH Crossover Low Byte ... 34
Option 16. PLL Tuner VHF LOW – VHF HIGH Crossover High Byte ... 34
Option 17. PLL Tuner VHF HIGH – UHF Crossover Low Byte ... 34
Option 18. PLL Tuner VHF HIGH – UHF Crossover High Byte ... 34
Option 19. PIP PLL Tuner Control 1 Byte ... 35
Option 20. PIP PLL Tuner Control 2 Low Byte ... 35
Option 21. PIP PLL Tuner Control 2 Mid Byte ... 35
Option 22. PIP PLL Tuner Control 2 High Byte ... 35
Option 23. PIP PLL Tuner VHF LOW – VHF HIGH Crossover Low Byte ... 35
Option 24. PIP PLL Tuner VHF LOW – VHF HIGH Crossover High Byte ... 35
Option 25. PIP PLL Tuner VHF HIGH – UHF Crossover Low Byte ... 36
Option 26. PIP PLL Tuner VHF HIGH – UHF Crossover High Byte ... 36
Option 27. Language Available 1 ... 36
Option 28. Language Available 2 ... 36
Option 29. Language Available 3 and Zoom Mode Available ... 36
Option 30. Country ... 37
Option 31. Prescaler MSP FM (AVL=OFF) ... 37
Option 32. Prescaler MSP NICAM (AVL=OFF) ... 37
Option 33. Prescaler MSP SCART (AVL=OFF) ... 38
Option 34. Prescaler MSP I2S (AVL=OFF) ... 38
Option 35. Not used ... 38
Option 36. Not used ... 38
Option 37. Reserved for USA ... 38
Option 38. TV Teletext Mode Selection, Child Lock, Equalizer Country ... 38

Option 39. Personal Preference Equalizer Band 1 39
Option 40. Personal Preference Equalizer Band 2 39
Option 41. Personal Preference Equalizer Band 3 39
Option 42. Personal Preference Equalizer Band 4 39
Option 43. Personal Preference Equalizer Band 5 39
Option 44. Sound Effect (Standard; Music; Speech; Jazz; Pp) 39
Option 45. Volume Offset Left 39
Option 46. Volume Offset Right 39
Option 47. Volume Offset Center 40
Option 48. Volume Offset Rear 40
Option 49. Surround Delay 40
Option 50. FM Prescale 40
Option 51. NICAM Prescale 40
Option 52. Scart Input Prescale 40
Option 53. I2S Prescale 40
Option 54. Scart Output Prescale 40
Option 55. Speaker Setup 41
Option 56. Audio Options Available Or Not 41
Option 57. Stereo Threshold 41
Option 58. MSP Audio Flags 42
Option 59. NICAM Threshold 42
Option 60. Power Delay Time 42
14.4.OPTION TABLE RECOMMENDED VALUES 45
14.5.SCREEN ADJUSTMENT (FBT SCREEN) 47
14.6.GEOMETRY ADJUSTMENT 48
4:3 FORMATS 48
16:9 FORMATS 49
16.BLOCK DIAGRAM 56
17.CIRCUIT DIAGRAMS 57

1.INTRODUCTION

This is a 50Hz colour television capable of driving 24" + CRT sizes (beginning from 24" 16:9 up to 33").
The chassis is capable of operation in PAL, SECAM, NTSC (playback) colour standards and multiple transmission standards as B/G, D/K, I/I', and L/L´.
Sound system output is supplying 2x10W (10%THD) for left and right outputs of 8ohm speakers.
TV supports FASTTEXT. It is possible to decode transmissions including high graphical data.
The chassis is equipped with three full EuroScarts, only one of them supports RGB input, one headphone output, one FAV input, one SVHS input (via SCART)

2.TUNER

The hardware and software of the TV is suitable for tuners, supplied by different companies, which are selected from the Service Menu. These tuners can be combined VHF, UHF tuners suitable for CCIR systems B/G, H, L, L´, I/I´, and D/K. The tuning is available through the digitally controlled I^2C bus (PLL). Below you will find info on one of the Tuners in use.

General description of UV1316:

The UV1316 tuner belongs to the UV 1300 family of tuners, which are designed to meet a wide range of applications. It is a combined VHF, UHF tuner suitable for CCIR systems B/G, H, L, L', I and I'. The low IF output impedance has been designed for direct drive of a wide variety of SAW filters with sufficient suppression of triple transient.

Features of UV1316:

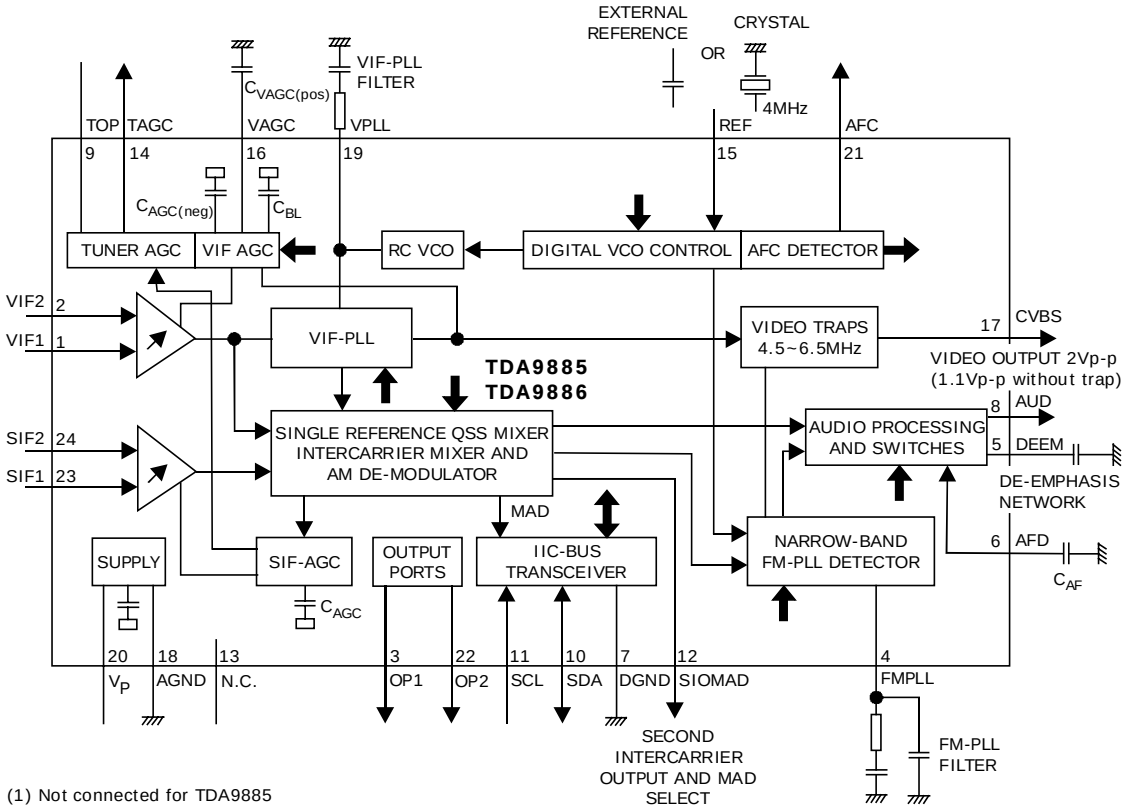
1. Member of the UV1300 family small sized UHF/VHF tuners
2. Systems CCIR: B/G, H, L, L', I and I'; OIRT: D/K
3. Digitally controlled (PLL) tuning via I^2C-bus
4. Off-air channels, S-cable channels and Hyperband
5. World standardised mechanical dimensions and world standard pinning
6. Compact size
7. Complies to "CENELEC EN55020" and "EN55013"

Pinning:

1.	Gain control voltage (AGC)	:	4.0V, Max: 4.5V
2.	Tuning voltage		
3.	I²C-bus address select	:	Max: 5.5V
4.	I²C-bus serial clock	:	Min:-0.3V, Max: 5.5V
5.	I²C-bus serial data	:	Min:-0.3V, Max: 5.5V
6.	Not connected		
7.	PLL supply voltage	:	5.0V, Min: 4.75V, Max: 5.5V
8.	ADC input		
9.	Tuner supply voltage	:	33V, Min: 30V, Max: 35V
10.	Symmetrical IF output 1		
11.	Symmetrical IF output 2		

3.IF PART (TDA9885/86)

The TDA9885 is an alignment-free single standard (without positive modulation) vision and sound IF signal PLL.
The TDA9886 is an alignment-free multi-standard (PAL, SECAM and NTSC) vision and sound IF signal PLL Both devices can be used for TV, VTR, PC and set-top box applications.
The following figure shows the simplified block diagram of the integrated circuit.
The integrated circuit comprises the following functional blocks:
VIF amplifier, Tuner and VIF-AGC, VIF-AGC detector, Frequency Phase-Locked Loop (FPLL) detector, VCO and divider, Digital acquisition help and AFC, Video demodulator and amplifier, Sound carrier trap, SIF amplifier, SIF-AGC detector, Single reference QSS mixer, AM demodulator, FM demodulator and acquisition help, Audio amplifier and mute time constant, I^2C-bus transceivers and MAD (module address), Internal voltage stabilizer.



4.VIDEO SWITCH TEA6415

In case of three or more external sources are used, the video switch IC TEA6415 is used. The main function of this device is to switch 8 video-input sources on the 6 outputs.

Each output can be switched on only one of each input. On each input an alignment of the lowest level of the signal is made (bottom of sync. top for CVBS or black level for RGB signals).

Each nominal gain between any input and output is 6.5dB.For D2MAC or Chroma signal the alignment is switched off by forcing, with an external resistor bridge, 5VDC on the input. Each input can be used as a normal input or as a MAC or Chroma input (with external Resistor Bridge). All the switching possibilities are changed through the BUS. Driving 75ohm load needs an external resistor. It is possible to have the same input connected to several outputs.

5.MULTI STANDARD SOUND PROCESSOR

The MSP 34x10G family of single-chip Multi-standard Sound Processors covers the sound processing of all analog TV-Standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed on a single chip.

The DBX noise reduction, or alternatively, MICRONAS Noise Reduction (MNR) is performed alignment free. Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM Stereo Radio standard.

6.SOUND OUTPUT STAGE WITH TDA7269A

The TDA7269A is class AB dual Audio power amplifier assembled in the Multi-watt package, specially designed for high quality sound application as Hi-Fi music centers and stereo TV sets.

7.BERTICAL OUTPUT STAGE WITH STV9379FA

The IC STV9379FA is the vertical deflection booster circuit. Two supply voltages, +14V and –14V are needed to scan the inputs VERT+ and VERT-, respectively. And a third supply voltage, +60V for the flyback limiting are needed. The vertical deflection coil is connected in series between the output and feedback to the input.

8.VIDEO OUTPUT AMPLIFIER TDA6108

The TDA6108Q includes three video output amplifiers is intended to drive the three cathodes of a colour picture tube.

9.POWER SUPPLY (SMPS)

The DC voltages required at various parts of the chassis are provided by an SMPS transformer controlled by the IC MC44608, which is designed for driving, controlling and protecting switching transistor of SMPS. The transformer generates 145V for FBT input, +/-14V for audio amplifier, 5V and 3.3V stand by voltage and 8V, 12V and 5V supplies for other different parts of the chassis.

An opto-coupler is used to control the regulation of line voltage and stand-by power consumption. There is a regulation circuit in secondary side. This circuit produces a control voltage according to the changes in 145V DC voltage, via an opto-coupler (TCET1102G) to pin3 of the IC.

During the switch on period of the transistor, energy is stored in the transformer. During the switch off period energy is fed to the load via secondary winding. By varying switch-on time of the power transistor, it controls each portion of energy transferred to the second side such that the output voltage remains nearly independent of load variations.

10.MICROCONTROLLER SDA55XX

10.1.General Features

• Feature selection via special function register
• Simultaneous reception of TTX, VPS, PDC, and WSS (line 23)
• Supply Voltage 2.5 and 3.3 V
• ROM version package PSDIP52-2, PMQFP64-1
• Romless version package PMQFP100-2, PLCC84-2

10.2.External Crystal and Programmable Clock Speed

• Single external 6MHz crystal, all necessary clocks are generated internally
• CPU clock speed selectable via special function registers.
• Normal Mode 33.33 MHz CPU clock, Power Save mode 8.33 MHz

10.3.Microcontroller Features

• 8bit 8051 instruction set compatible CPU.
• 33.33-MHz internal clock (max.)
• 0.360 ms (min.) instruction cycle
• Two 16-bit timers
• Watchdog timer
• Capture compare timer for infrared remote control decoding
• Pulse width modulation unit (2 channels 14 bit, 6 channels 8 bit)
• ADC (4 channels, 8 bit)
• UART (rxd, txd)

10.4.Memory

• Non-multiplexed 8-bit data and 16 … 20-bit address bus (ROMless Version)
• Memory banking up to 1Mbyte (Romless version)
• Up to 128 Kilobyte on Chip Program ROM
• Eight 16-bit data pointer registers (DPTR)
• 256-bytes on-chip Processor Internal RAM (IRAM)
• 128bytes extended stack memory.
• Display RAM and TXT/VPS/PDC/WSS-Acquisition-Buffer directly accessible via MOVX
• UP to 16KByte on Chip Extended RAM (XRAM) consisting of;
- 1 Kilobyte on-chip ACQ-buffer-RAM (access via MOVX)
- 1 Kilobyte on-chip extended-RAM (XRAM, access via MOVX) for user software
- 3 Kilobyte Display Memory

10.5.Display Features

• ROM Character Set Supports all East and West European Languages in single device
• Mosaic Graphic Character Set
• Parallel Display Attributes
• Single/Double Width/Height of Characters
• Variable Flash Rate
• Programmable Screen Size (25 Rows x 33...64 Columns)
• Flexible Character Matrixes (HxV) 12 x 9...16
• Up to 256 Dynamical Redefinable Characters in standard mode; 1024 Dynamical Redefinable Characters in Enhanced Mode
• CLUT with up to 4096 colour combinations

• Up to 16 Colours per DRCS Character
• One out of Eight Colours for Foreground and Background Colours for 1-bit DRCS and ROM Characters
• Shadowing
• Contrast Reduction
• Pixel by Pixel Shiftable Cursor With up to 4 Different Colours
• Support of Progressive Scan and 100Hz.
• 3 X 4Bits RGB-DACs On-Chip
• Free Programmable Pixel Clock from 10MHz to 32MHz
• Pixel Clock Independent from CPU Clock
• Multinorm H/V-Display Synchronisation in Master or Slave Mode

10.6.Acquisition Features
• Multi-standard Digital Data Slicer
• Parallel Multi-norm Slicing (TTX, VPS, WSS, CC, G+)
• Four Different Framing Codes Available
• Data Caption only limited by available Memory
• Programmable VBI-buffer
• Full Channel Data Slicing Supported
• Fully Digital Signal Processing
• Noise Measurement and Controlled Noise Compensation
• Attenuation Measurement and Compensation
• Group Delay Measurement and Compensation
• Exact Decoding of Echo Disturbed Signals

10.7.Ports
• One 8-bit I/O-port with open drain output and optional I^2C Bus emulation support (Port0)
• Two 8-bit multifunction I/O-ports (Port1, Port3)
• One 4-bit port working as digital or analogue inputs for the ADC (Port2)
• One 2-bit I/O port with secondary function (P4.2, 4.3, 4.7)
• One 4-bit I/O-port with secondary function (P4.0, 4.1, 4.4) (Not available in P-SDIP 52)

11.CLASS AB STEREO HEADPHONE DRIVER TDA1308

The TDA1308 is an integrated class AB stereo headphone driver contained in a DIP8 plastic package. The device is fabricated in a 1 mm CMOS process and has been primarily developed for portable digital audio applications.

12.SAW FILTERS

K3953M:
Standard
B/G, D/K, I, L/L'
Features
TV IF filter with Nyquist slopes at 33,90 MHz and 38,90 MHz
Constant group delay
Suitable for CENELEC EN 55020
Terminals
Tinned CuFe alloy
Pin configuration
1 Input
2 Input - ground
3 Chip carrier - ground
4 Output
5 Output

K3958M:
Standard
B/G, D/K, I, L/L'
Features
TV IF filter with Nyquist slopes at 33.90MHz and 38.90MHz
Constant group delay
Terminal and Pin configuration are the same with K3953M

K9356M:
Standard
B/G, D/K, I, L
Features
TV IF audio filter with pass band for sound carriers at 32.40MHz (D/K, L), 32.90MHz (I) and 33.40MHz (B/G)
Terminal and Pin configuration are the same with K3953M

K9656M:
Standard
B/G, D/K, I, L/L'
Features
TV IF audio filter with two channels
Channel 1 (L') with one pass band for sound carriers at 40.40MHz (L') and 39.75MHz (L'- NICAM)
Channel 2 (B/G, D/K, L, I) with one pass band for sound carriers between 32.35MHz and 33.40MHz
Terminal and Pin configuration are the same with K3953M

13.IC DESCRIPTIONS

LM317T
MSP3410G
TEA6415
TDA7269A
24C08
MC44608
TDA9885T
TDA1308T
VDP3130Y
STV9379FA
LM7805/LM7808
SDA55XX
TCET1102G

13.1.LM317T

13.1.1.Description

The LM317T is an adjustable 3 terminal positive voltage regulator capable of supplying in excess of 1.5 amps over an output range of 1.25 to 37 volts. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current limiting, thermal shutdown and safe area compensation, making it essentially blow–out proof. The LM317 serves a wide variety of applications including local, on card regulation. This device can also be used to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM317 can be used as a precision current regulator.

13.1.2.Features

• Output Current in Excess of 1.5 A
• Output Adjustable between 1.2 V and 37 V
• Internal Thermal Overload Protection
• Internal Short Circuit Current Limiting Constant with Temperature
• Output Transistor Safe–Area Compensation
• Floating Operation for High Voltage Applications
• Available in Surface Mount D^2PAK, and Standard 3–Lead Transistor Package
• Eliminates Stocking many Fixed Voltages

13.2.TDA1308T

13.2.1.General Description

The TDA1308 is an integrated class AB stereo headphone driver contained in an SO8 or a DIP8 plastic package. The device is fabricated in a 1 mm CMOS process and has been primarily developed for portable digital audio applications. It gets its input from two analog audio outputs (DACA_L and DACA_R) of MSP 34x0G. The gain of the output is adjustable by the feedback resistor between the inputs and outputs.

13.2.2.Features

• Wide temperature range
• No switch ON/OFF clicks
• Excellent power supply ripple rejection

• Low power consumption
• Short-circuit resistant
• High performance
• high signal-to-noise ratio
• High slew rate
• Low distortion
• Large output voltage swing.

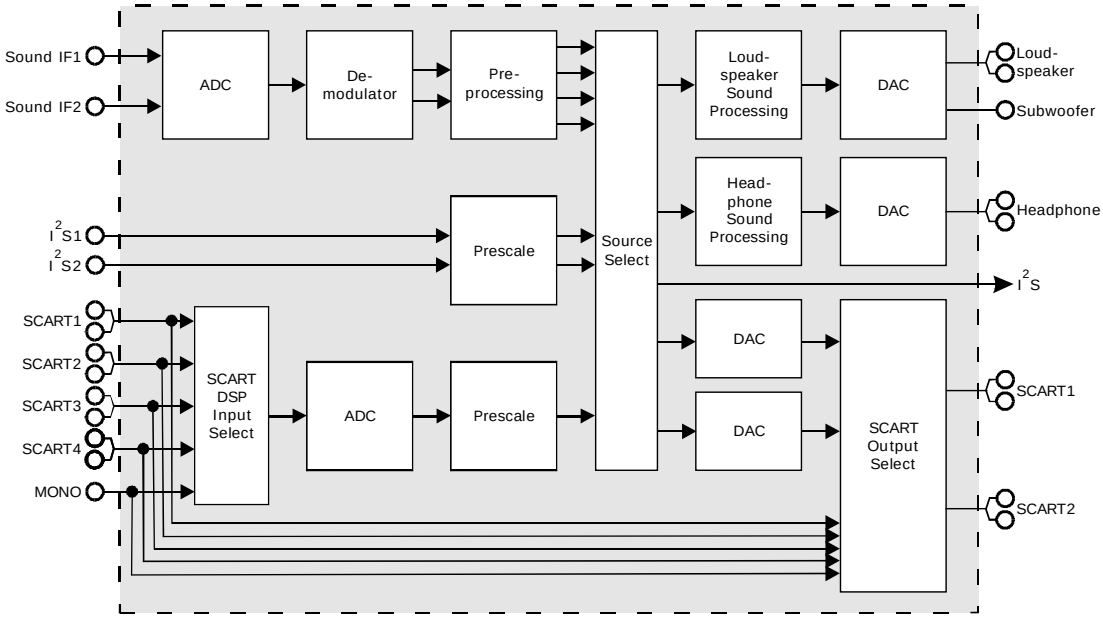
13.2.3.Pinning

SYMBOL	PIN	DESCRIPTION
OUTA	1	Output A
INA(neg)	2	Inverting input A
INA(pos)	3	Non-inverting input A
V_{SS}	4	Negative supply
INB(pos)	5	Non-inverting input B
INB(neg)	6	Inverting input B
OUTB	7	Output B
V_{DD}	8	Positive supply

13.3.MSP34X0G (MSP3410G)

13.3.1.Description

The MSP 34x0G family of single-chip Multi standard Sound Processors covers the sound processing of all analog TV-Standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed on a single chip. Figure shows a simplified functional block diagram of the MSP 34x0G.



This new generation of TV sound processing ICs now includes versions for processing the multi channel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction, or alternatively, MICRONAS Noise Reduction (MNR) is performed alignment free. Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM Stereo Radio standard. Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and EIA-J. The MSP 34x0G has optimum stereo performance without any adjustments.
All MSP 34x0G versions are pin and software downward compatible to the MSP34x0D. The MSP34x0G further simplifies controlling software. Standard selection requires a single I^2C transmission only.
The MSP 34x0G has built-in automatic functions: The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I^2C interaction is necessary (Automatic Sound Selection).

13.3.2.Features

Standard Selection with single I^2C transmission
Automatic Standard Detection of terrestrial TV standards
Automatic Sound Selection (mono/stereo/bilingual), new registers MODUS, STATUS
Two selectable sound IF (SIF) inputs
Automatic Carrier Mute function
Interrupt output programmable (indicating status change)
Loudspeaker / Headphone channel with volume, balance, bass, treble, loudness
AVC: Automatic Volume Correction
Subwoofer output with programmable low-pass and complementary high-pass filter
5-band graphic equalizer for loudspeaker channel
Spatial effect for loudspeaker channel
Four Stereo SCART (line) inputs, one Mono input; two Stereo SCART outputs
Complete SCART in/out switching matrix
Two I^2S inputs; one I^2S output
Dolby Pro Logic with DPL 351xA coprocessor
All analog FM-Stereo A2 and satellite standards; AM-SECAM L standard
Simultaneous demodulation of (very) high-deviation FM-Mono and NICAM
Adaptive deemphasis for satellite (Wegener-Panda, acc. to ASTRA specification)
ASTRA Digital Radio (ADR) together with DRP 3510A
All NICAM standards
Korean FM-Stereo A2 standard

13.3.3.Pin connections

NC = not connected; leave vacant
LV = if not used, leave vacant
X = obligatory; connect as described in circuit diagram
DVSS: if not used, connect to DVSS
AHVSS: connect to AHVSS

Pin No.					Pin Name	Type	Connection (if not used)	Short Description
PLCC 68-pin	PSDIP 64-pin	PSDIP 52-pin	PQFP 80-pin	PLQFP 64-pin				
1	16	14	9	8	ADR_WS	OUT	LV	ADR word strobe
2	-	-	-	-	NC		LV	Not connected
3	15	13	8	7	ADR_DA	OUT	LV	ADR Data Output
4	14	12	7	6	I2S_DA_IN1	IN	LV	I^2S1 data input
5	13	11	6	5	I2S_DA_OUT	OUT	LV	I^2S data output
6	12	10	5	4	I2S_WS	IN/OUT	LV	I^2S word strobe
7	11	9	4	3	I2S_CL	IN/OUT	LV	I^2S clock
8	10	8	3	2	I2C_DA	IN/OUT	X	I^2C data
9	9	7	2	1	I2C_CL	IN/OUT	X	I^2C data
10	8	-	1	64	NC		LV	Not connected
11	7	6	80	63	STANDBYQ	IN	X	Stand-by (low-active)
12	6	5	79	62	ADR_SEL	IN	X	I^2C bus address select
13	5	4	78	61	D_CTR_I/O_0	IN/OUT	LV	D_CTR_I/O_0
14	4	3	77	60	D_CTR_I/O_1	IN/OUT	LV	D_CTR_I/O_1
15	3	-	76	59	NC		LV	Not connected
16	2	-	75	58	NC		LV	Not connected
17	-	-	-	-	NC		LV	Not connected
18	1	2	74	57	AUD_CL_OUT	OUT	LV	Audio clock output (18.432 MHz)
19	64	1	73	56	TP		LV	Test pin
20	63	52	72	55	XTAL_OUT	OUT	X	Crystal oscillator
21	62	51	71	54	XTAL_IN	IN	X	Crystal oscillator
22	61	50	70	53	TESTEN	IN	X	Test pin
23	60	49	69	52	ANA_IN2+	IN	AVSS via 56 pF/LV	IF Input 2 (can be left vacant, only if IF input 1 is also not in use)
24	59	48	68	51	ANA_IN-	IN	AVSS via 56 pF/LV	IF common (can be left vacant, only if IF input 1 is also not in use)
25	58	47	67	50	ANA_IN1+	IN	LV	IF input 2
26	57	46	66	49	AVSUP		X	Analog power supply 5v
-	-	-	65	-	AVSUP		X	Analog power supply 5v

-	-	-	64	-	NC		LV	Not connected
-	-	-	63	-	NC		LV	Not connected
27	56	45	62	48	AVSS		X	Analog ground
-	-	-	61	-	AVSS		X	Analog ground
28	55	44	60	47	MONO_IN	IN	LV	Mono input
-	-	-	59	-	NC		LV	Not connected
29	54	43	58	46	VREFTOP		X	Reference voltage IF A/D converter
30	53	42	57	45	SC1_IN_R	IN	LV	SCART 1 input, right
31	52	41	56	44	SC1_IN_L	IN	LV	SCART 1 input, left
32	51	-	55	43	ASG1		AHVSS	Analog Shield Ground 1
33	50	40	54	42	SC2_IN_R	IN	LV	SCART 2 input, right
34	49	39	53	41	SC2_IN_L	IN	LV	SCART 2 input, left
35	48	-	52	40	ASG2		AHVSS	Analog Shield Ground 2
36	47	38	51	39	SC3_IN_R	IN	LV	SCART 3 input, right
37	46	37	50	38	SC3_IN_L	IN	LV	SCART 3 input, left
38	45	-	49	37	ASG4		AHVSS	Analog Shield Ground 4
39	44	-	48	36	SC4_IN_R	IN	LV	SCART 4 input, right
40	43	-	47	35	SC4_IN_L	IN	LV	SCART 4 input, left
41	-	-	46	-	NC		LV or AHVSS	Not connected
42	42	36	45	34	AGNDC		X	Analog reference voltage
43	41	35	44	33	AHVSS		X	Analog ground
-	-	-	43	-	AHVSS		X	Analog ground
-	-	-	42	-	NC		LV	Not connected
-	-	-	41	-	NC		LV	Not connected
44	40	34	40	32	CAPL_M		X	Volume capacitor MAIN
45	39	33	39	31	AHVSUP		X	Analog power supply 8V
46	38	32	38	30	CAPL_A		X	Volume capacitor AUX
47	37	31	37	29	SC1_OUT_L	OUT	LV	SCART output 1, left
48	36	30	36	28	SC1_OUT_R	OUT	LV	SCART output 1, right
49	35	29	35	27	VREF1		X	Reference ground 1
50	34	28	34	26	SC2_OUT_L	OUT	LV	SCART output 2, left
51	33	27	33	25	SC2_OUT_R	OUT	LV	SCART output 2, right
52	-	-	32	-	NC		LV	Not connected
53	32	-	31	24	NC		LV	Not connected
54	31	26	30	23	DACM_SUB	OUT	LV	Subwoofer output
55	30	-	29	22	NC		LV	Not connected
56	29	25	28	21	DACM_L	OUT	LV	Loudspeaker out, left
57	28	24	27	20	DACM_R	OUT	LV	Loudspeaker out, right
58	27	23	26	19	VREF2		X	Reference ground 2
59	26	22	25	18	DACA_L	OUT	LV	Headphone out, left
60	25	21	24	17	DACA_R	OUT	LV	Headphone out, right
-	-	-	23	-	NC		LV	Not connected
-	-	-	22	-	NC		LV	Not connected
61	24	20	21	16	RESETQ	IN	X	Power-on-reset
62	23	-	20	15	NC		LV	Not connected
63	22	-	19	14	NC		LV	Not connected
64	21	19	18	13	NC		LV	Not connected
65	20	18	17	12	I2S_DA_IN2	IN	LV	I^2S2-data input
66	19	17	16	11	DVSS		X	Digital ground
-	-	-	15	-	DVSS		X	Digital ground
-	-	-	14	-	DVSS		X	Digital ground
67	18	16	13	10	DVSUP		X	Digital power supply 5V
-	-	-	12	-	DVSUP		X	Digital power supply 5V
-	-	-	11	-	DVSUP		X	Digital power supply 5V
68	17	15	10	9	ADR_CL	OUT	LV	ADR clock

13.4.VDP313xY

13.4.1.Introduction

The VDP 313xY is a video IC family of high-quality single-chip video processors. Modular design and a sub-micron technology allow the economic integration of features in all classes of TV sets. The VDP 313xY family is based on the VDP 31xxB including YC_RC_B inputs for DVD component signals.
The VDP 313xY includes complete video, display and deflection processing. All processing is done digitally, the video frontend and video backend are interfacing to the analog world. Most functions of the VDP can be controlled by software via I^2C-Bus interface

13.4.2.Features

Video Decoding and Processing

– four CVBS, one S-VHS input, one YC R C B component input
– integrated high-quality A/D converters and associated clamp and AGC circuits
– adaptive 2H comb filter Y/C separator
– multistandard colour decoder PAL/NTSC/SECAM including all substandards
– multistandard sync decoder
– automatic standard recognition
– black-line detector
– linear horizontal scaling (0.25...4), as well as nonlinear horizontal scaling “Panoramavision”
– black-level expander
– dynamic peaking
– soft limiter (gamma correction)
– colour transient improvement

RGB Processing and Deflection

– programmable RGB matrix
– two analog RGB / Fastblank inputs
– half-contrast switch
– picture frame generator
– scan velocity modulation output
– high-performance H/V deflection
– separate ADC for tube measurements
– EHT compensation
– angle and bow correction
– one 20.25 MHz crystal, few external components
–I^2C-Bus Interface
– 64-pin PSDIP package

13.4.3.Pin Connections and short descriptions

NC = not connected
X = obligatory; connect as described in circuit diagram
OUT = Output
LV = if not used, leave vacant
IN = Input
SUPPLY = Supply Pin

Pin no PSDIP 64-pin	Pin name	Type	Connection (if not used)	Short description
1	TEST	IN	GNDD	Test Input
2	RESQ	IN	X	Reset Input
3	SCL	IN/OUT	X	I^2C Bus Clock
4	SDA	IN/OUT	X	I^2C Bus Data
5	GNDD	SUPPLY	X	Digital Ground
6	HCS	IN	LV	Half Contrast Switch Input
7	FSY	OUT	LV	Front Sync Output
8	CSY	OUT	LV	Composite Sync Output
9	VS	OUT	LV	Vertical Sync Output (=VS Bit of MSY for TPU)
10	INTLC	OUT	LV	Intefrace Control Output
11	VPROT	IN	GNDAB	Vertical Protection Input
12	SAFETY	IN	GNDAB	Safety Input
13	HFLB	IN	HOUT	Horizontal Flyback Input
14	GNDD	SUPPLY	X	Digital Ground
15	VSUPD	SUPPLY	X	Digital Supply Voltage (3.3V)
16	GNDD	SUPPLY	X	Digital Ground
17	VSUPD	SUPPLY	LV	Digital Supply Voltage (3.3V)
18	P0	IN/OUT	LV	Port 1, Bit 0
19	P1	IN/OUT	LV	Port 1, Bit 1
20	P2	IN/OUT	GNDD	Port 1, Bit 2
21	P3	IN/OUT	GNDD	Port 1, Bit 3
22	P4	IN/OUT	GNDD	Port 1, Bit 4
23	P5	IN/OUT	GNDD	Port 1, Bit 5
24	P6	IN/OUT	GNDD	Port 1, Bit 6

25	GNDD	SUPPLY	X	Digital Ground
26	RSW2	OUT	GNDAB	Range Switch 2 for Measurement ADC
27	RSW1	OUT	GNDAB	Range Switch 1 for Measurement ADC
28	SENSE	IN	GNDAB	Sense ADC Input
29	GNDM	SUPPLY	X	Ground, MADC ınput
30	VERTQ	OUT	LV	Inverted Vertical Sawtooth Output
31	VERT	OUT	LV	Vertical Sawtooth Output
32	E/w	OUT	LV	Vertical Parabola Output
33	XREF	IN	X	Reference Input for RGB DACs
34	SVMOUT	OUT	VSUPAB	Analog Scan Velocity Modulation Output
35	GNDAB	SUPPLY	X	Analog Ground Backend
36	VSUPAB	SUPPLY	X	Analog Supply Voltage (5.0V) Backend
37	ROUT	OUT	VSUPAB	Analog Red Output
38	GOUT	OUT	VSUPAB	Analog Green Output
39	BOUT	OUT	VSUPAB	Analog Blue Output
40	VRD	IN	X	DAC Reference
41	RIN	IN	GNDAB	Analog Red Input
42	GIN	IN	GNDAB	Analog Green Input
43	BIN	IN	GNDAB	Analog Blue Input
44	FBLIN	IN	GNDAB	Fast Blank Input
45	RIN2	IN	GNDAB	Analog Red Input2
46	GIN2	IN	GNDAB	Analog Green Input2
47	BIN2	IN	GNDAB	Analog Blue Input2
48	FBLIN2	IN	GNDAB	Fast Blank Input2
49	CLK20	OUT	LV	20.25 MHz System Clock Output
50	HOUT	OUT	X	Horizontal Drive Output
51	XTAL 1	IN	X	Analog Crystal Input
52	XTAL 2	OUT	X	Analog Crystal Output
53	CIN 2/CRIN		LV	Analog Chroma 2/Component C_R Input
54	CBIN	IN	LV	Component C_B Input
55	GNDAF	SUPPLY	X	Analog Ground Frontend
56	SGND	IN	GNDAF	Signal Ground for Analog Input
57	VRT	IN	X	Reference Voltage Top, Video ADC
58	VSUPAF	SUPPLY	X	Analog Supply Voltage (5.0V) Frontend
59	VOUT	OUT	LV	Analog Video Output
60	CIN1	IN	VRT	Analog Chroma 1 Input
61	VIN1	IN	VRT	Analog Video 1 Input
62	VIN2	IN	VRT	Analog Video 2 Input
63	VIN3	IN	VRT	Analog Video 3 Input
64	VIN4	IN	VRT	Analog Video 4 Input

13.5.TEA6415C

13.5.1.General Description

The main function of the IC is to switch 8 video input sources on 6 outputs. Each output can be switched on only one of each input. On each input an alignment of the lowest level of the signal is made (bottom of synch. top for CVBS or black level for RGB signals). Each nominal gain between any input and output is 6.5dB. For D2MAC or Chroma signal the alignment is switched off by forcing, with an external resistor bridge, 5 V_{DC} on the input. Each input can be used as a normal input or as a MAC or Chroma input (with external resistor bridge). All the switching possibilities are changed through the BUS. Driving 75Ω load needs an external transistor. It is possible to have the same input connected to several outputs. The starting configuration upon power on (power supply: 0 to 10V) is undetermined. In this case, 6 words of 16 bits are necessary to determine one configuration. In other case, 1 word of 16 bits is necessary to determine one configuration.

13.5.2.Features

• 20MHz Bandwidth
• Cascadable with another TEA6415C (Internal address can be changed by pin 7 voltage)
• 8 Inputs (CVBS, RGB, MAC, CHROMA,...)
• 6 Outputs
• Possibility of MAC or chroma signal for each input by switching-off the clamp with an external resistor bridge
• Bus controlled

• 6.5dB gain between any input and output
• 55dB crosstalk at 5mHz
• Fully ESD protected

13.5.3.Pinning

1. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
2. Data : Low level : -0.3V Max: 1.5V,
   High level : 3.0V Max : Vcc+0.5V
3. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
4. Clock : Low level : -0.3V Max: 1.5V,
   High level : 3.0V Max : Vcc+0.5V
5. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
6. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
7. Prog
8. Input : Max : 2Vpp, Input Current: 1mA, Max: 3mA
9. Vcc : 12V
10. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
11. Input : Max : 2Vpp, Input Current: 1mA, Max : 3mA
12. Ground
13. Output : 5.5Vpp, Min : 4.5Vpp
14. Output : 5.5Vpp, Min : 4.5Vpp
15. Output : 5.5Vpp, Min : 4.5Vpp
16. Output : 5.5Vpp, Min : 4.5Vpp
17. Output : 5.5Vpp, Min : 4.5Vpp
18. Output : 5.5Vpp, Min : 4.5Vpp
19. Ground
20. Input : Max : 2Vpp, Input Current : 1mA, Max : 3mA

13.6.STV9379FA

13.6.1.Description

Designed for monitors and high performance TVs, the STV9379FA vertical deflection booster can handle flyback voltage up to 90V. Further to this, it is possible to have a flyback voltage, which is more than the double of the supply (Pin 2). This allows to decrease the power consumption, or to decrease the flyback time for a given supply voltage. The STV9379FA operates with supplies up to 42V and provides up to 2.6APP output current to drive the yoke. The STV9379FA is offered in HEPTAWATT package.

13.6.2.Features

Power Amplifier
Thermal Protection
Output Current Up To 2.6APP
Flyback Voltage Up To 90V (on Pin 5)
Suitable For DC Coupling Application
External Flyback Supply

13.6.3.Pinning

Pin1 : Output Stage Supply
Pin2 : Output
Pin3 : GND or Negative Supply
Pin4 : Flyback Supply
Pin5 : Supply Voltage
Pin6 : Inverting Input
Pin7 : Non-inverting Input

13.7.TDA7269A

13.7.1.Description

The TDA7269A is class AB dual Audio power amplifier assembled in the Multiwatt package, specially designed for high quality sound application as Hi-Fi music centres and stereo TV sets.

13.7.2.Features

Wide Supply Voltage Range Up To ±20V
Split Supply
High Output Power
14 + 14W @THD =10%, R_L =8Ω,V_S= +16V
No Pop at Turn-On/Off
Mute (Pop Free)
Stand-By Feature (Low I_q)
Short Circuit Protection To Gnd
Thermal Overload Protection

13.8.LM7800 (LM7805/LM7808)

13.8.1.Description

The L7800 series of three-terminal positive regulators is available in TO-220 TO-220FP TO-3 and D 2 PAK packages and several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shutdown and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

13.8.2.Features

Output Current Up To 1.5 A
Output Voltages of 5; 5.2; 6; 8; 8.5; 9; 12; 15; 18; 24V
Thermal Over load protection
Short Circuit Protection
Output Transition SOA Protection

13.9.AT24C08

13.9.1.Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read-only memory (EEPROM) organised as 128/256/512/1024/2048 words of 8 bits each. The device is optimised for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C01A/02/04/08/16 is available in space-saving 8-pin PDIP, (AT24C01A/02/04/08/16), 8-lead TSSOP (AT24C01A/02/04/08/16) and 8-lead JEDEC SOIC (AT24C01A/02/04/08/16) packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 5.0V (4.5V to 5.5V), 2.7V (2.7V to 5.5V), 2.5V (2.5V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

13.9.2.Features

• Low-voltage and Standard-voltage Operation
– 5.0 (V CC = 4.5V to 5.5V)
– 2.7 (V CC = 2.7V to 5.5V)
– 2.5 (V CC = 2.5V to 5.5V)
– 1.8 (V CC = 1.8V to 5.5V)
• Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
• 2-wire Serial Interface
• Schmitt Trigger, Filtered Inputs for Noise Suppression
• Bi-directional Data Transfer Protocol
• 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
• Write Protect Pin for Hardware Data Protection

• 8-byte Page (1K, 2K), 16-byte Page (4K, 8K, 16K) Write Modes
• Partial Page Writes are Allowed
• Self-timed Write Cycle (10 ms max)
• High-reliability
– Endurance: 1 Million Write Cycles
– Data Retention: 100 Years
• Automotive Grade and Extended Temperature Devices Available
• 8-lead JEDEC SOIC, 8-pin PDIP and 8-lead TSSOP Packages

13.9.3.Pin Configurations

Pin name	Function
A0-A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

13.10.SDA5555

13.10.1.General definition

The SDA55XX is a single chip teletext decoder for decoding World System Teletext data as well as Video Programming System (VPS), Program Delivery Control (PDC), and Wide Screen Signalling (WSS) data used for PAL plus transmissions (Line 23). The device also supports Closed caption acquisition and decoding. The device provides an integrated general-purpose, fully 8051-compatible Microcontroller with television specific hardware features. Microcontroller has been enhanced to provide powerful features such as memory banking, data pointers, and additional interrupts etc. The on-chip display unit for displaying Level 1.5 teletext data can also be used for customer defined on screen displays. Internal XRAM consists of up to 16 Kbytes. Device has an internal ROM of up to 128 KBytes. ROMless versions can access up to 1 MByte of external RAM and ROM. The SDA 55XX supports a wide range of standards including PAL, NTSC and contains a digital slicer for VPS, WSS, PDC, TTX and Closed Caption, an accelerating acquisition hardware module, a display generator for Level 1.5 TTX data and powerful On screen Display capabilities based on parallel attributes, and Pixel oriented characters (DRCS).

13.10.2.Features

General
• Feature selection via special function register
• Simultaneous reception of TTX, VPS, PDC, and WSS (line 23)
• Supply Voltage 2.5 and 3.3 V
• ROM version package PSDIP52-2, PMQFP64-1
• Romless version package PMQFP100-2, PLCC84-2

External Crystal and Programmable Clock Speed
• Single external 6MHz crystal, all necessary clocks are generated internally
• CPU clock speed selectable via special function registers.
• Normal Mode 33.33MHz CPU clock, Power Save mode 8.33MHz

Microcontroller Features
• 8-bit 8051 instruction set compatible CPU.
• 33.33MHz internal clock (max.)
• 0.360ms (min.) instruction cycle
• Two 16-bit timers
• Watchdog timer
• Capture compare timer for infrared remote control decoding
• Pulse width modulation unit (2 channels 14 bit, 6 channels 8 bit)
• ADC (4 channels, 8 bit)
• UART

Memory
• Non-multiplexed 8-bit data and 16 … 20-bit address bus (ROMless Version)
• Memory banking up to 1Mbyte (Romless version)
• Up to 128 Kilobyte on Chip Program ROM
• Eight 16-bit data pointer registers (DPTR)
• 256-bytes on-chip Processor Internal RAM (IRAM)
• 128bytes extended stack memory.
• Display RAM and TXT/VPS/PDC/WSS-Acquisition-Buffer directly accessible via MOVX
• UP to 16KByte on Chip Extended RAM (XRAM) consisting of;
- 1 Kilobyte on-chip ACQ-buffer-RAM (access via MOVX)
- 1 Kilobyte on-chip extended-RAM (XRAM, access via MOVX) for user software
- 3 Kilobyte Display Memory

Display Features
• ROM Character Set Supports all East and West European Languages in single device
• Mosaic Graphic Character Set
• Parallel Display Attributes
• Single/Double Width/Height of Characters
• Variable Flash Rate
• Programmable Screen Size (25 Rows x 33...64 Columns)
• Flexible Character Matrixes (HxV) 12 x 9...16
• Up to 256 Dynamical Redefinable Characters in standard mode; 1024 Dynamical Redefinable Characters in Enhanced Mode
• CLUT with up to 4096 colour combinations
• Up to 16 Colours per DRCS Character
• One out of Eight Colours for Foreground and Background Colours for 1-bit DRCS and ROM Characters
• Shadowing
• Contrast Reduction
• Pixel by Pixel Shiftable Cursor With up to 4 Different Colours
• Support of Progressive Scan and 100 Hz.
• 3 X 4Bits RGB-DACs On-Chip
• Free Programmable Pixel Clock from 10 MHz to 32MHz
• Pixel Clock Independent from CPU Clock
• Multinorm H/V-Display Synchronization in Master or Slave Mode

Acquisition Features
• Multistandard Digital Data Slicer
• Parallel Multi-norm Slicing (TTX, VPS, WSS, CC, G+)
• Four Different Framing Codes Available
• Data Caption only Limited by available Memory
• Programmable VBI-buffer
• Full Channel Data Slicing Supported
• Fully Digital Signal Processing
• Noise Measurement and Controlled Noise Compensation
• Attenuation Measurement and Compensation
• Group Delay Measurement and Compensation
• Exact Decoding of Echo Disturbed Signals

Ports
• One 8-bit I/O-port with open drain output and optional I^2C Bus emulation support (Port 0)
• Two 8-bit multifunction I/O-ports (Port 1, Port 3)
• One 4-bit port working as digital or analog inputs for the ADC (Port 2)
• One 2-bit I/O port with secondary functions (P4.2, 4.3, 4.7)
• One 4-bit I/O-port with secondary function (P4.0, 4.1, 4.4) (Not available in P-SDIP 52)

13.11.MC44608

13.11.1.Description

The MC44608 is a high performance voltage mode controller designed for off–line converters. This high voltage circuit that integrates the start–up current source and the oscillator capacitor, requires few

external components while offering a high flexibility and reliability. The device also features a very high efficiency stand–by management consisting of an effective Pulsed Mode operation. This technique enables the reduction of the stand–by power consumption to approximately 1W while delivering 300mW in a 150W SMPS.

• Integrated Start–Up Current Source
• Lossless Off–Line Start–Up
• Direct Off–Line Operation
• Fast Start–Up

13.11.2.General Features

• Flexibility
• Duty Cycle Control
• Under voltage Lockout with Hysteresis
• On Chip Oscillator Switching Frequency 40, or 75kHz
• Secondary Control with Few External Components

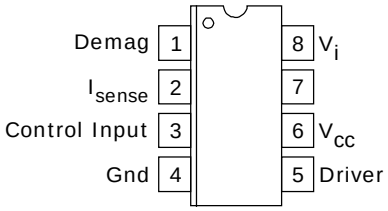
Protections

• Maximum Duty Cycle Limitation
• Cycle by Cycle Current Limitation
• Demagnetization (Zero Current Detection) Protection
• "Over V_{CC} Protection" Against Open Loop
• Programmable Low Inertia Over Voltage Protection Against Open Loop
• Internal Thermal Protection

GreenLine™ Controller

• Pulsed Mode Techniques for a Very High Efficiency Low Power Mode
• Lossless Startup
• Low dV/dT for Low EMI Radiations

13.11.3.Pin Connections



13.11.4.Pin Function description

Pin	Name	Description
1	Demag	The Demag pin offers 3 different functions: Zero voltage crossing detection (50mV), 24mA current detection and 120mA current detection. The 24mA level is used to detect the secondary reconfiguration status and the 120mA level to detect an Over Voltage status called Quick OVP.
2	ISENSE	The Current Sense pin senses the voltage developed on the series resistor inserted in the source of the power MOSFET. When I sense reaches 1V, the Driver output (pin 5) is disabled. This is known as the Over Current Protection function. A 200mA current source is flowing out of the pin 3 during the start–up phase and during the switching phase in case of the Pulsed Mode of operation. A resistor can be inserted between the sense resistor and the pin 3; thus a programmable peak current detection can be performed during the SMPS stand–by mode.
3	Control Input	A feedback current from the secondary side of the SMPS via the opto–coupler is injected into this pin. A resistor can be connected between this pin and GND to allow the programming of the Burst duty cycle during the Stand–by mode.
4	Ground	This pin is the ground of the primary side of the SMPS.
5	Driver	The current and slew rate capability of this pin are suited to drive Power MOSFETs.
6	VCC	This pin is the positive supply of the IC. The driver output gets disabled when the voltage becomes higher than 15V and the operating range is between 6.6V and 13V. An intermediate voltage level of 10V creates a disabling condition called Latched Off phase.
7		This pin is to provide isolation between the Vi pin 8 and the VCC pin 6.
8	Vi	This pin can be directly connected to a 500V voltage source for start–up function of the IC. During the Start–up phase a 9mA current source is internally delivered to the VCC pin 6 allowing a rapid charge of the VCC capacitor. As soon as the IC starts–up, this current source is disabled.

13.12.TCET1102G

13.12.1.Description

The TCET110/ TCET2100/ TCET4100 consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in a 4-lead up to 16-lead plastic dual inline package. The elements are mounted on one lead frame using a **co-planar techniqu**e, providing a fixed distance between input and output for highest safety requirements.

13.12.2.Applications

Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation):
For appl. class I – IV at mains voltage ≤300 V
For appl. class I – III at mains voltage ≤600 V
According to VDE 0884, table 2, suitable for: **Switch-mode power supplies, line receiver, computer peripheral interface, microprocessor system interface.**

13.12.3.Features

VDE 0884 related features:
Rated impulse voltage (transient overvoltage) V_{IOTM} = 8 kV peak
Isolation test voltage (partial discharge test voltage) V_{pd} = 1.6 kV
Rated isolation voltage (RMS includes DC) V_{IOWM} = 600 V_{RMS} (848 V peak)
Rated recurring peak voltage (repetitive) V_{IORM} = 600 V_{RMS}

General features:
CTR offered in 9 groups
Isolation materials according to UL94-VO
Pollution degree 2 (DIN/VDE 0110 / resp. IEC 664)
Climatic classification 55/100/21 (IEC 68 part 1)
Special construction: Therefore, extra low coupling capacity of typical 0.2pF, high **C**ommon **M**ode **R**ejection
Low temperature coefficient of CTR
G = Leadform 10.16 mm; provides creepage distance > 8 mm, for TCET2100/ TCET4100 optional; suffix letter 'G' is not marked on the optocoupler
Coupling System U

13.13.TDA9885T

13.13.1.General Description

The TDA9885 is an alignment-free single standard (without positive modulation) vision and sound IF signal PLL.

13.13.2.Features

- 5 V supply voltage
- Gain controlled wide-band Vision Intermediate Frequency (VIF) amplifier (AC-coupled)
- Multistandard true synchronous demodulation with active carrier regeneration (very linear demodulation, good intermodulation figures, reduced harmonics, excellent pulse response)
- Gated phase detector for L/L accent standard
- Fully integrated VIF Voltage Controlled Oscillator (VCO), alignment-free; frequencies switchable for all negative and positive modulated standards via I^2C-bus
- Digital acquisition help, VIF frequencies of 33.4, 33.9, 38.0, 38.9, 45.75 and 58.75 MHz
- 4 MHz reference frequency input [signal from Phase-Locked Loop (PLL) tuning system] or operating as crystal oscillator
- VIF Automatic Gain Control (AGC) detector for gain control, operating as peak sync detector for negative modulated signals and as a peak white detector for positive modulated signals
- Precise fully digital Automatic Frequency Control (AFC) detector with 4-bit digital-to-analog converter; AFC bits via I^2C -bus readable
- TakeOver Point (TOP) adjustable via I^2C-bus or alternatively with potentiometer
- Fully integrated sound carrier trap for 4.5, 5.5, 6.0 and 6.5 MHz, controlled by FM-PLL oscillator
- Sound IF (SIF) input for single reference Quasi Split Sound (QSS) mode (PLL controlled)

• SIF AGC for gain controlled SIF amplifier; single reference QSS mixer able to operate in high performance single reference QSS mode and in intercarrier mode, switchable via I²C-bus
• AM demodulator without extra reference circuit
• Alignment-free selective FM-PLL demodulator with high linearity and low noise
• I²C-bus control for all functions
• I²C-bus transceiver with pin programmable Module Address (MAD).

13.13.3.Pinning

SYMBOL	PIN	DESCRIPTION
VIF1	1	VIF differential input 1
VIF2	2	VIF differential input 2
OP1	3	output 1 (open-collector)
FMPLL	4	FM-PLL for loop filter
DEEM	5	de-emphasis output for capacitor
AFD	6	AF decoupling input for capacitor
DGND	7	digital ground
AUD	8	audio output
TOP	9	tuner AGC TakeOver Point (TOP)
SDA	10	I²C-bus data input/output
SCL	11	I²C-bus clock input
SIOMA	12	sound intercarrier output and MAD select
n.c.	13	not connected
TAGC	14	tuner AGC output
REF	15	4 MHz crystal or reference input
VAGC	16	VIF-AGC for capacitor; note 1
CVBS	17	video output
AGND	18	analog ground
VPLL	19	VIF-PLL for loop filter
V_P	20	supply voltage (+5 V)
AFC	21	AFC output
OP2	22	output 2 (open-collector)
SIF1	23	SIF differential input 1
SIF2	24	SIF differential input 2

13.14.PI5V330

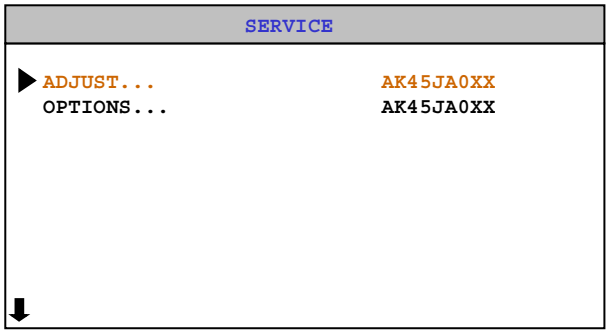
13.14.1.General Description

The PI5V330 is well suited for video applications when switching composite or RGB analog. A picture-in-picture application will be described in this brief. The pixel-rate creates video overlays so two or more pictures can be viewed at the same time. An inexpensive NTSC titler can be implemented by superimposing the output of a character generator on a standard composite video background.

14. PRODUCTION SERVICE MODE ADJUSTMENTS

14.1.SERVICE MENU

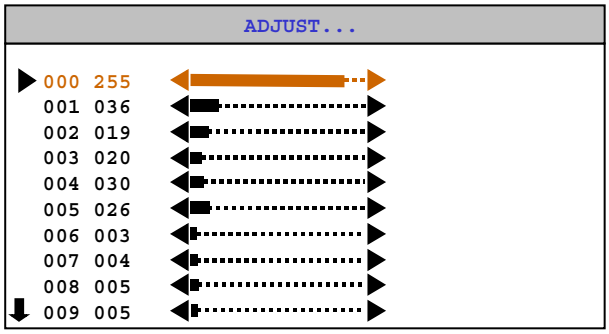
All system, geometry and white balance alignments are performed in production service mode. Before starting the production mode alignments, make sure that all manual adjustments are done correctly. To start production mode alignments enter the MAIN MENU and then press the digits 4, 7, 2 and 5 respectively or press **MUTE** and **INFO** buttons at the same time. The following first menu appears on the screen.



You can select Adjust or Options items by pressing Up/Down buttons. Selected parameter will be highlighted. In order to enter the selected parameter, press Left or Right button. To exit the service menu press MENU button. Entire service menu parameters of the model are listed below.

14.2.ADJUST MENU

Select the parameter by pressing up/down buttons. Adjust the parameter by pressing Left/Right buttons. In ADJUST menu, changed values are stored automatically.



White Point Red, White Point Green, White Point Blue:
Not used.

AGC
Apply PAL BG signal, VHF-3 Channel-12 and 60dBµV signal level. Adjust AGC (Automatic Gain Control) item by pressing Left/Right buttons till the voltage at AGC point (pin1 of the tuner) becomes 3.0 volts.

If PLL negative
Not used.

If PLL positive
Not used.

Y-Delay
Enter a PAL B/G colour and black-white bar test pattern via RF. Adjust Y-Delay for PAL till the colour transients on the colour bar of the pattern become as sharper and colours between transients do not mix with each other as possible.

Y-Delay SECAM
Enter a SECAM B/G colour and black-white bar test pattern via RF. Adjust Y-Delay SECAM till the colour transients on the colour bar of the pattern become as sharper and colours between transients do not mix with each other as possible.

Y-Delay NTSC
Enter an NTSC colour and black-white bar test pattern via RF. Adjust Y-Delay NTSC till the colour transients on the colour bar of the pattern become as sharper and colours between transients do not mix with each other as possible.

Y-Delay other
Not used.

Vertical Position Offset
This value is fixed (127)

Vertical Position Offset
This value is fixed (127)

Horizontal Position Offset
This value is fixed (127)

Horizontal Position Offset
This value is fixed (127)

Vertical Blank Start
This register will be used only at 4:3 tube for 16:9 mode adjustment. It adjusts the vertical blank start position.

Vertical Blank Stop
This register will be used only at 4:3 tube for 16:9 mode adjustment. It adjusts the vertical blank stop position.

Angle
Change Angle by pressing Left/Right buttons till the vertical lines of the crosshatch pattern become completely perpendicular to horizontal lines without any angle of vertical deviation. Check and readjust ANGLE item if the adjustment becomes improper after some other geometric adjustments are done.

Bow
Change Bow by pressing Left/Right buttons till the vertical lines especially ones close to the left and right sides will of equal and symmetrical bending, i.e. they together will neither be towards left side nor right side. Check and readjust BOW item if the adjustment becomes improper after some other geometric adjustments are done.

4:3 Horizontal Blank Start
This register will be used only at 16:9 tube for 4:3 mode adjustment. It adjusts the horizontal blank start position.

4:3 Horizontal Blank Stop
This register will be used only at 16:9 tube for 4:3 mode adjustment. It adjusts the horizontal blank stop position.

EHTV Compensation
It's used to adjust the EHT compensation vertical gain coefficient.

EHTTM Compensation
It's used to adjust the EHT compensation time constant.

EHTEW Compensation
It's used to adjust the EHT compensation east/west gain coefficient.

WDR
The amplitude of R of RGB output can be adjusted with the drive parameter WDR.

WDG
The amplitude of G of RGB output can be adjusted with the drive parameter WDG.

WDB
The amplitude of B of RGB output can be adjusted with the drive parameter WDB.

CR
The DC offset values of R of RGB output can be adjusted with the cutoff parameter CR.

CG
The DC offset values of G of RGB output can be adjusted with the cutoff parameter CG.

CB
The DC offset values of B of RGB output can be adjusted with the cutoff parameter CB.

COR coring level
The amplitude of the correction signal is adjustable. Small noise amplitudes in the correction signal are suppressed by an adjustable coring circuit.

REGULAR VERT_POS (Regular mode Vertical Position)
Enter a PAL B/G circle test pattern via RF. Change Vertical Position till the test pattern is vertically centered. Horizontal line at the center pattern is in equal distance both to upper and lower side of the picture tube. Check and readjust Vertical Position item if the adjustment becomes improper after some other geometric adjustments are done.
It's used to adjust the vertical position of regular mode.

REGULAR VERT_AMPL (Regular mode Vertical Amplitude)
It's used to adjust the vertical amplitude of regular mode.

REGULAR VERT_SCOR (Regular mode Vertical S-Correction)
It's used to adjust the vertical s-correction of regular mode.

REGULAR VERT_SSYM(Regular mode Vertical S Symmetry)
It's used to adjust the vertical s-symmetry of regular mode.

REGULAR TRAPEZE (Regular mode Trapeze)
Change Trapezium by pressing Left/Right buttons till vertical lines, especially lines at the sides of the picture frame became parallel to the both sides of picture tube as close as possible. Check and readjust TRPEZ item if the adjustment becomes improper after some other geometric adjustments are done.
It's used to adjust the trapeze of regular mode.

REGULAR CUSHION (Regular mode Cushion)
It's used to adjust the cushion of regular mode.

REGULAR HOR_COR_SYM (Regular mode Horizontal Corner Symmetry)
It's used to adjust the horizontal corners symmetry of regular mode.

REGULAR HOR_CORNER (Regular mode Horizontal Corner)
It's used to adjust the horizontal corners of regular mode.

REGULAR HORZ_POS (Regular mode Horizontal Position)
Enter a PAL B/G circle test pattern via RF. Change Horizontal Position until the picture is horizontally centered. Check and readjust Horizontal Position item if the adjustment becomes improper after some other geometric adjustments are done.
It's used to adjust the horizontal position of regular mode.

REGULAR HORZ_AMPL (Regular mode Horizontal Amplitude)
It's used to adjust the horizontal amplitude of regular mode.

PANORAMIC VERT_POS (Panoramic mode Vertical Position)
It's used to adjust the vertical position of panoramic mode.

PANORAMIC VERT_AMPL (Panoramic mode Vertical Amplitude)
It's used to adjust the vertical amplitude of panoramic mode.

PANORAMIC VERT_SCOR (Panoramic mode Vertical S-Correction)
It's used to adjust the vertical s-correction of panoramic mode.

PANORAMIC VERT_SSYM (Panoramic mode Vertical S-Symmetry)
It's used to adjust the vertical s-symmetry of panoramic mode.

PANORAMIC TRAPEZE (Panoramic mode Trapeze)
It's used to adjust the trapeze of panoramic mode.

PANORAMIC CUSHION (Panoramic mode Cushion)
It's used to adjust the cushion of panoramic mode.

PANORAMIC HOR_COR_SYM (Panoramic mode Horizontal corner symmetry)
It's used to adjust the horizontal corners symmetry of panoramic mode.

PANORAMIC HOR_CORNER (Panoramic mode Horizontal corner)
It's used to adjust the horizontal corners of panoramic mode.

PANORAMIC HORZ_POS (Panoramic mode Horizontal position)
It's used to adjust the horizontal position of panoramic mode.

PANORAMIC HORZ_AMPL (Panoramic mode Horizontal amplitude)
It's used to adjust the horizontal amplitude of panoramic mode.

14:9 ZOOM VERT_POS (14:9 Zoom mode Vertical Position)
It's used to adjust the vertical position of 14:9 zoom mode.

14:9 ZOOM VERT_AMPL (14:9 Zoom mode Vertical Amplitude)
It's used to adjust the vertical amplitude of 14:9 zoom mode.

14:9 ZOOM VERT_SCOR (14:9 Zoom mode Vertical S-Correction)
It's used to adjust the vertical s-correction of 14:9 zoom mode.

14:9 ZOOM VERT_SSYM (14:9 Zoom mode Vertical Symmetry)
It's used to adjust the vertical s-symmetry of 14:9 zoom mode.

14:9 ZOOM TRAPEZE (14:9 Zoom mode Trapeze)
It's used to adjust the trapeze of 14:9 zoom mode.

14:9 ZOOM CUSHION (14:9 Zoom mode Cushion)
It's used to adjust the cushion of 14:9 zoom mode.

14:9 ZOOM HOR_COR_SYM (14:9 Zoom mode Corner Symmetry)
It's used to adjust the horizontal corners symmetry of 14:9 zoom mode.

14:9 ZOOM HOR_CORNER (14:9 Zoom mode Horizontal Corner)
It's used to adjust the horizontal corners of 14:9 zoom mode.

14:9 ZOOM HORZ_POS (14:9 Zoom mode Horizontal Position)
It's used to adjust the horizontal position of 14:9 zoom mode.

14:9 ZOOM HORZ_AMPL (14:9 Zoom mode Horizontal Amplitude)
It's used to adjust the horizontal amplitude of 14:9 zoom mode.

16:9 ZOOM VERT_POS (16:9 Zoom mode Vertical Position)
It's used to adjust the vertical position of 16:9 zoom mode.

16:9 ZOOM VERT_AMPL (16:9 Zoom mode Vertical Amplitude)
It's used to adjust the vertical amplitude of 16:9 zoom mode.

16:9 ZOOM VERT_SCOR (16:9 Zoom mode Vertical S-Correction)
It's used to adjust the vertical s-correction of 16:9 zoom mode.

16:9 ZOOM VERT_SSYM (16:9 Zoom mode Vertical S-Symmetry)
It's used to adjust the vertical s-symmetry of 16:9 zoom mode.

16:9 ZOOM TRAPEZE (16:9 Zoom mode Trapeze)
It's used to adjust the trapeze of 16:9 zoom mode.

16:9 ZOOM CUSHION (16:9 Zoom mode Cushion)
It's used to adjust the cushion of 16:9 zoom mode.

16:9 ZOOM HOR_COR_SYM (16:9 Zoom mode Horizontal corner symmetry)
It's used to adjust the horizontal corners symmetry of 16:9 zoom mode.

16:9 ZOOM HOR_CORNER (16:9 Zoom mode Horizontal corner)
It's used to adjust the horizontal corners of 16:9 zoom mode.

16:9 ZOOM HORZ_POS (16:9 Zoom mode Horizontal position)
It's used to adjust the horizontal position of 16:9 zoom mode.

16:9 ZOOM HORZ_AMPL (16:9 Zoom mode Horizontal amplitude)
It's used to adjust the horizontal amplitude of 16:9 zoom mode.

16:9 ZOOM SUBTITLE VERT_POS (16:9 Zoom Subtitle mode Vertical position)
It's used to adjust the vertical position of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE VERT_AMPL (16:9 Zoom Subtitle mode Vertical amplitude)
It's used to adjust the vertical amplitude of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE VERT_SCOR (16:9 Zoom Subtitle mode Vertical S-Correction)
It's used to adjust the vertical s-correction of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE VERT_SSYM (16:9 Zoom Subtitle mode Vertical Symmetry)
It's used to adjust the vertical s-symmetry of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE TRAPEZE (16:9 Zoom Subtitle mode Trapeze)
It's used to adjust the trapeze of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE CUSHION (16:9 Zoom Subtitle mode Cushion)
It's used to adjust the cushion of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE HOR_COR_SYM (16:9 Zoom Subtitle mode Horizontal Corner Symmetry)
It's used to adjust the horizontal corners symmetry of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE HOR_CORNER (16:9 Zoom Subtitle mode Horizontal corner)
It's used to adjust the horizontal corners of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE HORZ_POS (16:9 Zoom Subtitle mode Horizontal position)
It's used to adjust the horizontal position of 16:9 zoom subtitle mode.

16:9 ZOOM SUBTITLE HORZ_AMPL (16:9 Zoom Subtitle mode Horizontal amplitude)
It's used to adjust the horizontal amplitude of 16:9 zoom subtitle mode.

OSD Position
It's used to adjust the horizontal position of the OSD.

BCLTHR
Beam current threshold

BCLG
Beam current loop gain

ROTATION (TILT)
This adjustment only works when the TV has rotation option. Change TILT by pressing Left/Right buttons to rotate the complete raster clock-wise and counter clock-wise depending on the CRT. Check and readjust TRPEZ item if the adjustment becomes improper after some other geometric adjustments are done.

LSLSA, LSLSB, LSL2, LSLTA, LSLTB (Luma soft limiter)
LSLSA: Luma soft limiter slope A (fixed)
LSLSB: Luma soft limiter slope B (fixed)
LSL2: Luma soft limiter absolute limit (fixed)
LSLTA: Luma soft limiter segment A tilt point (fixed)
LSLTB: Luma soft limiter segment A tilt point (fixed)

REFERENCE WDR RED (NORMAL)
The amplitude of R of RGB output can be adjusted with the drive parameter WDR for the colour temperature of normal mode.

REFERENCE WDR GREEN (NORMAL)
The amplitude of G of RGB output can be adjusted with the drive parameter WDR for the colour temperature of normal mode.

REFERENCE WDR BLUE (NORMAL)
The amplitude of B of RGB output can be adjusted with the drive parameter WDR for the colour temperature of normal mode.

REFERENCE CUTOFF RED
It's fixed.

REFERENCE CUTOFF GREEN
It's fixed.

REFERENCE CUTOFF BLUE
It's fixed.

IBRM
Internal Brightness, the brightness for measurement can be set to measure at higher cutoff current. The measurement brightness is independent of the drive values. It's used to adjust the maximum brightness level.

WDRV
White drive measurement control. It is used to adjust the maximum contrast level.

ACC_SAT (COLOUR OFFSET)
It's used to adjust the max. colour level.

G2 CUTOFF REFERENCE
It's fixed.

G2 WDR REFERENCE
It's fixed.

POFS2 (RGB HORIZONTAL SHIFT)
It's used to adjust the horizontal position of RGB signal.

REFERENCE WDR RED COOL
The amplitude of R of RGB output can be adjusted with the drive parameter WDR for the colour temp of cool mode.

REFERENCE WDR GREEN COOL
The amplitude of G of RGB output can be adjusted with the drive parameter WDR for the colour temp of cool mode.

REFERENCE WDR BLUE COOL
The amplitude of B of RGB output can be adjusted with the drive parameter WDR for the colour temp of cool mode.

REFERENCE WDR RED WARM
The amplitude of R of RGB output can be adjusted with the drive parameter WDR for the colour temp of warm mode.

REFERENCE WDR GREEN WARM
The amplitude of G of RGB output can be adjusted with the drive parameter WDR for the colour temp of cool mode.

REFERENCE WDR BLUE WARM
The amplitude of B of RGB output can be adjusted with the drive parameter WDR for the colour temp of cool mode.

STANDARD MODE BRIGHTNESS
It's used to adjust the brightness value of standard mode.

STANDARD MODE COLOUR
It's used to adjust the colour value of standard mode.

STANDARD MODE CONTRAST
It's used to adjust the contrast value of standard mode.

FULL VERT_POS (16:9 MODE)
It's used to adjust the vertical position of 16:9 mode (full mode).

FULL VERT_AMPL
It's used to adjust the vertical amplitude of 16:9 mode (full mode).

FULL VERT_SCOR
It's used to adjust the vertical s-correction of 16:9 mode (full mode).

FULL VERT_SSYM
It's used to adjust the vertical s-symmetry of 16:9 mode (full mode).

FULL TRAPEZE
It's used to adjust the trapeze of 16:9 mode (full mode).

FULL CUSHION
It's used to adjust the cushion of 16:9 mode (full mode).

FULL HOR_COR_SYM
It's used to adjust the horizontal corners symmetry of 16:9 mode (full mode).

FULL HOR_CORNER
It's used to adjust the horizontal corners of 16:9 mode (full mode).

FULL HORZ_POS
It's used to adjust the horizontal position of 16:9 mode (full mode).

FULL HORZ_AMPL
It's used to adjust the horizontal amplitude of 16:9 mode (full mode).

BRIGHT MODE BRIGHTNESS
It's used to adjust the brightness value of bright mode.

BRIGHT MODE COLOUR
It's used to adjust the colour value of bright mode.

BRIGHT MODE CONTRAST
It's used to adjust the contrast value of bright mode.

SOFT MODE BRIGHTNESS
It's used to adjust the brightness value of soft mode.

SOFT MODE COLOUR
It's used to adjust the colour value of soft mode.

SOFT MODE CONTRAST
It's used to adjust the contrast value of soft mode.

PERSONAL MODE FACTORY SETTING BRIGHTNESS
It's fixed.

PERSONAL MODE FACTORY SETTING COLOUR
It's fixed.

PERSONAL MODE FACTORY SETTING CONTRAST
It's fixed.

SCINC FOR PANAROMIC MODE
scaler1 coefficient, this scaler is compressing the signal.

SCINC1 FOR PANAROMIC MODE
scaler2 coefficient, this scaler is expanding the signal.

VOLUME AFTER APS
It's used to adjust the volume level after APS.

VERTICAL SCROLL
It's used to adjust the step width for scroll function.

14:9 HORIZANTAL START
It's used to adjust the horizontal blank start position for 14:9 mode.

14:9 HORIZANTAL STOP
It's used to adjust the horizontal blank stop position for 14:9 mode.

4:3 RGB HORIZANTAL AMPLITUDE
It's used to adjust the horizontal amplitude in 4:3 mode for RGB signals.

4:3 RGB CUSHION
It's used to adjust the cushion in 4:3 mode for RGB signals.

14:9 RGB HORIZANTAL AMPLITUDE
It's used to adjust the horizontal amplitude in 14:9 mode for RGB signals.

14:9 RGB CUSHION
It's used to adjust the cushion in 14:9 mode for RGB signals.

PANAROMIC RGB HORIZONTAL AMPLITUDE
It's used to adjust the horizontal amplitude in panoramic mode for RGB signals.

16:9 RGB HORIZANTOL AMPLITUDE
It's used to adjust the horizontal amplitude in 16:9 mode for RGB signals.

16:9 SUBTITLE RGB HORIZONTAL AMPLITUDE
It's used to adjust the horizontal amplitude in 16:9 subtitle mode for RGB signals.

FULL RGB HORIZONTAL AMPLITUDE
It's used to adjust the horizontal amplitude in full mode for RGB signals.

TELETEXT HORZ_POS
It's used to adjust the horizontal position of teletext signal.

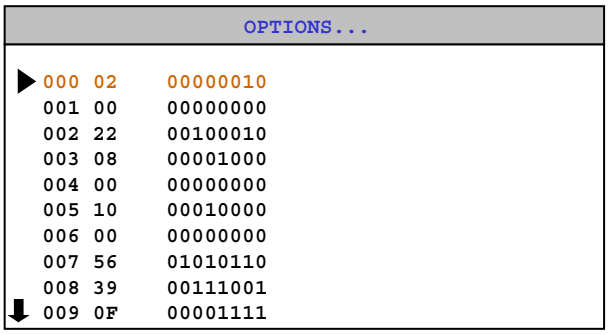
ADJUST	EXPLANATION	2835	2835W
		MULTI	MULTI - PAL I
000	White Point RED	255	255
001	White Point GREEN	126	036
002	Whit Point BLUE	127	019
003	AGC (Automatic Gain Control)	20 It will be adjusted to below 1V of Max. AGC for each TV.	
004	IF-PLL Negative	030	030
005	IF-PLL Positive	026	026
006	Y-Delay	003	002
007	Y-Delay SECAM	004	003
008	Y-Delay NTSC	005	005
009	Y-Delay OTHER	005	005
010	Vertical Position Offset	127	127
011	Vertical Amplitude Offset	127	127
012	Horizontal Position Offset	127	127
013	Horizontal Amplitude Offset	127	127
014	Vertical Blank Start (It will be used only at 4:3 tube for 16:9 mode adjustment)	149	119
015	Vertical Blank Stop (It will be used only at 4:3 tube for 16:9 mode adjustment)	013	034
016	Angle	132	132
017	Bow	126	131
018	4:3 Horz. Blank Start (It will be used only at 16:9 tube for 4:3 mode adjustment)	021	042
019	4:3 Horz. Blank Stop (It will be used only at 16:9 tube for 4:3 mode adjustment)	140	175
020	EHTV compensation	054	066
021	EHTTM compensation	004	001
022	EHTEW compensation	219	160
023	WDR	VIDEO PROCESSOR ADJUSTS ITSELF.	
024	WDG		
025	WDB		
026	CR		
027	CG		
028	CB		
029	COR coring level	015	031
030	REGULAR VERT_POS (Vertical Position)	128	129
031	REGULAR VERT_AMPL (Vertical Amplitude)	081	055
032	REGULAR VERT_SCOR (Vertical S Correction)	131	129
033	REGULAR VERT_SSYM (Vertical S Symmetry)	139	136
034	REGULAR TRAPEZE	125	127
035	REGULAR CUSHION	162	153
036	REGULAR HOR_COR_SYM(Horizontal Corner Symmetry)	137	132
037	REGULAR HOR_CORNER (Horizontal Corner)	094	113
038	REGULAR HORZ_POS (Horizontal Position)	055	052
039	REGULAR HORZ_AMPL (Horizontal Amplitude)	057	030
040	PANORAMIC VERT_POS	-	129
041	PANORAMIC VERT_AMPL	-	050
042	PANORAMIC VERT_SCOR	-	129
043	PANORAMIC VERT_SSYM	-	139
044	PANORAMIC TRAPEZE	-	125
045	PANORAMIC CUSHION	-	156
046	PANORAMIC HOR_COR_SYM	-	141
047	PANORAMIC HOR_CORNER	-	108
048	PANORAMIC HORZ_POS	-	030

049	PANORAMIC HORZ_AMPL	-	013
050	14:9 ZOOM VERT_POS	-	129
051	14:9 ZOOM VERT_AMPL	-	043
052	14:9 ZOOM VERT_SCOR	-	129
053	14:9 ZOOM VERT_SSYM	-	140
054	14:9 ZOOM TRAPEZE	-	125
055	14:9 ZOOM CUSHION	-	159
056	14:9 ZOOM HOR_COR_SYM	-	141
057	14:9 ZOOM HOR_CORNER	-	110
058	14:9 ZOOM HORZ_POS	-	053
059	14:9 ZOOM HORZ_AMPL	-	032
060	16:9 ZOOM VERT_POS	-	129
061	16:9 ZOOM VERT_AMPL	-	035
062	16:9 ZOOM VERT_SCOR	-	129
063	16:9 ZOOM VERT_SSYM	-	148
064	16:9 ZOOM TRAPEZE	-	125
065	16:9 ZOOM CUSHION	-	164
066	16:9 ZOOM HOR_COR_SYM	-	138
067	16:9 ZOOM HOR_CORNER	-	104
068	16:9 ZOOM HORZ_POS	-	036
069	16:9 ZOOM HORZ_AMPL	-	020
070	16:9 ZOOM SUBTITLE VERT_POS	-	137
071	16:9 ZOOM SUBTITLE VERT_AMPL	-	039
072	16:9 ZOOM SUBTITLE VERT_SCOR	-	124
073	16:9 ZOOM SUBTITLE VERT_SSYM	-	146
074	16:9 ZOOM SUBTITLE TRAPEZE	-	119
075	16:9 ZOOM SUBTITLE CUSHION	-	164
076	16:9 ZOOM SUBTITLE HOR_COR_SYM	-	162
077	16:9 ZOOM SUBTITLE HOR_CORNER	-	081
078	16:9 ZOOM SUBTITLE HORZ_POS	-	035
079	16:9 ZOOM SUBTITLE HORZ_AMPL	-	021
080	OSD Position	217	205
081	BCLTHR Beam current threshold	050	060
082	BCLG Beam current loop gain	008	007
083	ROTATION (TILT)	000	000
084	LSLSA Luma soft limiter	000	003
085	LSLSB Luma soft limiter	000	000
086	LSL2 Luma soft limiter	255	255
087	LSLTA Luma soft limiter	000	000
088	LSLTB Luma soft limiter	000	001
089	REFERENCE WDR RED (NORMAL)	088	092
090	REFERENCE WDR GREEN (NORMAL)	074	083
091	REFERENCE WDR BLUE (NORMAL)	075	082
092	REFERENCE CUTOFF RED	065	055
093	REFERENCE CUTOFF GREEN	068	069
094	REFERENCE CUTOFF BLUE	077	069
095	IBRM	200	215
096	WDRV	075	060
097	ACC_SAT (COLOUR OFFSET)	154	130
098	G2_CUTOFF_REFERENCE	200	220
099	G2_WDR_REFERENCE	090	090
100	POFS2 (RGB HORIZANTAL SHIFT)	053	034
101	REFERENCE WDR RED COOL	090	089
102	REFERENCE WDR GREEN COOL	078	082
103	REFERENCE WDR BLUE COOL	093	090
104	REFERENCE WDR RED WARM	096	104
105	REFERENCE WDR GREEN WARM	070	085
106	REFERENCE WDR BLUE WARM	073	080
107	STANDARD MODE BRIGHTNESS	027	043

108	STANDARD MODE COLOUR	050	047
109	STANDARD MODE CONTRAST	022	029
110	FULL VERT_POS (16:9 MODE)	128	129
111	FULL VERT_AMPL	093	055
112	FULL VERT_SCOR	131	129
113	FULL VERT_SSYM	133	136
114	FULL TRAPEZE	127	126
115	FULL CUSHION	148	153
116	FULL HOR_COR_SYM	137	136
117	FULL HOR_CORNER	109	109
118	FULL HORZ_POS	055	035
119	FULL HORZ_AMPL	057	020
120	BRIGHT MODE BRIGHTNESS	027	043
121	BRIGHT MODE COLOUR	050	050
122	BRIGHT MODE CONTRAST	030	032
123	SOFT MODE BRIGHTNESS	027	043
124	SOFT MODE COLOUR	050	058
125	SOFT MODE CONTRAST	017	020
126	PERSONAL MODE FACTORY SETTING BRIGHTNESS	027	043
127	PERSONAL MODE FACTORY SETTING COLOUR	050	050
128	PERSONAL MODE FACTORY SETTING CONTRAST	030	032
129	SCINC FOR PANORAMIC MODE	032	056
130	SCINC1 FOR PANORAMIC MODE	032	125
131	VOLUME AFTER APS		005
132	VERTICAL SCROLL	005	008
133	14:9 HORIZONTAL START (It will be used only at 16:9 tube for 14:9 mode adjustment)	-	031
134	14:9 HORIZONTAL STOP (It will be used only at 16:9 tube for 14:9 mode adjustment)	-	185
135	4:3 RGB HORIZONTAL AMPLITUDE	055	074
136	4:3 RGB CUSHION	163	150
137	14:9 RGB HORIZONTAL AMPLITUDE	-	055
138	14:9 RGB CUSHION	-	158
139	PANAROMIC RGB HORIZONTAL AMPLITUDE	-	031
140	16:9 RGB HORIZONTAL AMPLITUDE	-	027
141	16:9 SUBTITLE RGB HORIZONTAL AMPLITUDE	-	027
142	FULL RGB HORIZONTAL AMPLITUDE	054	027
143	TELETEXT HORIZONTAL POSITION	101	095

14.3.OPTIONS MENU

Select the parameter by pressing up/down buttons. Adjust the parameter by pressing Left/Right buttons. In OPTIONS menu, some of the changed parameters are not stored automatically. To store the adjusted parameters, you should turn off and on TV.



Option 0. Video Processor Crystal Indication

B7: x = x
B6: x = x
B5: x = x
B4: x = x
B3: x = x
B2: x = x
B1: Xa = note1 (Crystal indication)
B0: Xb = note1 (Crystal indication)

note 1:
Xa,Xb
0,1 : Pal M, Pal N, NTSC M

Pin 34 : 3.58 (1, 2 or 3 crystals)
Pin 35 : No crystal

1,0 : Pal BG, Pal DK, Pal I/I+, Secam BG, Secam DK, Secam L/L', Secam K1

Pin 34 : No crystal
Pin 35 : 4.43 (1 crystal)

1,1 : Pal BG, Pal DK, Pal I/I+, Secam BG, Secam DK, Secam L/L', Secam K1, Pal M, Pal N, Ntsc M

Pin 34 : 3.58 (1, 2 or 3 crystals)
Pin 35 : 4.43 (1 crystal)

Option 1. (0x01) Video Processor Decoder Mode Register

B7: x = x
B6: x = x
B5: x = x
B4: x = x
B3: x = x
B2: x = x
B1: x = x
B0: x = x

Option 2. (0x18) Video Processor Blanking Control

B7: SWF = 1 (Subwoofer item at menu)
B6: Vsd = 0 (Vertical scan disable)
B5: x = x

B4: x = x
B3: x = x
B2: x = x
B1: LUMA = 1 Luma Soft Limiter Enabled
B0: BB = 1 Blue Background Option

Option 3. (0x19) Video Processor Cathode Drive Level

B7: x = x
B6: x = x
B5: x = x
B4: x = x
B3: x = x
B2: x = x
B1: x = x
B0: country = note 0

Note 0: choice for others country option
1 : BG
0 : DK

Option 4.

B7: x = x
B6: x = x
B5: x = x
B4: x = x
B3: x = x
B2: x = x
B1: x = x
B0: x = x

Option 5. CTI Available, Mono AVL

B7: x = x
B6: x = x
B5: x = x
B4: x = x
B3: x = x
B2: x = x
B1: x = x
B0: x = x

Option 6.

B7: = TEXT LANGUAGE 3
B6: = TEXT LANGUAGE 2
B5: = TEXT LANGUAGE 1
B4: x = x
B3: x = x
B2: x = x
B1: x = x
B0: x = x

Option 7. OPTIONHOTELACTIVE, PLL_VST, PIP Zoom Mode, PIP Position

B7: x = x
B6: x = x
B5: F = note 1
B4: x = x
B3: x = x
B2: PZM= x
B1: AV2 = 1 AV2 Output enabled
B0: x = x

note 1:
F : Frequency Mode
1: = Frequency Menu Item available
0: = Frequency Menu Item not available

Option 8. IF Frequency

B7:	x	=	x	
B6:	x	=	x	
B5:	IfI	=	0	note 3
B4:	IfD	=	0	note 4
B3:	IfM	=	note 5	
B2:	Aps	=	note 6	
B1:	Hp	=	note 7	
B0:	Hue	=	note 8	

note 3:
IfI

1	=	IF I 39.5 MHz	Great Britain I ,	Only UHF Tuner	
0	=	IF I 38.9 MHz	Ireland I+ ,	Standard Tuner	

note 4:
IfD
1 = IF DK 38.0 MHz
0 = IF DK 38.9 MHz

note 5:
IfM

1	=	IF M,N 45.75 MHz	S&N American Models	, Tuner UV1336	(Only Pal M/N, Ntsc M)
0	=	IF M,N 38.9 MHz	Euro M,N Models	, Standard Tuner	

Note 6:
Aps (Only for PLL)
0 = A.P.S. done
1 = A.P.S. set

note 7:
Hp : Headphone available
0 = No headphone
1 = Headphone available

note 8:
Hue : Hue Available
0 = No Hue
1 = Hue available

Option 9. Standard Available

B7:	NM	=	note 1
B6:	PN	=	note 1
B5:	PM	=	note 1
B4:	K1	=	note 1
B3:	L	=	note 1
B2:	I	=	note 1
B1:	DK	=	note 1
B0:	BG	=	note 1

note 1:
0 = Standard not supported
1 = Standard available

Option 10. Scart, Comb filter, Teletext, Language

B7: x = x
B6: RGB = note 2
B5: FAV =
B4: AV2S =
B3: FSVHS = note 3
B2: BAV = note 4
B1: Sc2 = note 5
B0: BSVHS = note 6

note 2 :
RGB = RGB Menu Item active/inactive

0 = RGB Menu Item inactive
1 = RGB Menu Item active

note 3:
0 = Front S-VHS not supported
1 = Front S-VHS available

note 4:
0 = Back AV (AV-3) not supported
1 = Back AV (AV-3) available

note 5:
0 = Scart 2 not supported
1 = Scart 2 available

note 6:
0 = Back SVHS not supported
1 = Back SVHS available

Option 11. PLL Tuner Control 1 Byte

Pll tuner control 1 byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316T MK3	1	0	0	0	1	1	1	0
Philips	UV1316MK2	1	0	0	0	1	1	1	0
Alps	TELE9X062A	1	0	0	0	1	1	1	0
Samsung	TEXX2949PG28A	1	0	0	0	1	1	1	0
Siel	PT060	1	0	0	0	1	1	1	0
Temic	5001PH5-3X0003	1	0	0	0	1	1	1	0
Thomson	CTT5020	1	0	0	0	1	1	1	0

Option 12. PLL Tuner Control 2 Low Byte

Pll tuner control 2 low byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316T MK3	0	0	0	0	0	0	0	1
Philips	UV1316MK2	1	0	1	0	0	0	0	1
Alps	TELE9X062A	0	0	0	0	0	0	0	1
Samsung	TEXX2949PG28A	0	0	0	0	0	0	0	1
Siel	PT060	0	1	1	0	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	0	1	0
Thomson	CTT5020	0	0	0	0	0	0	1	1

Option 13. PLL Tuner Control 2 Mid Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316T MK3	0	0	0	0	0	0	1	0
Philips	UV1316MK2	1	0	0	1	0	0	1	0
Alps	TELE9X062A	0	0	0	0	0	0	1	0
Samsung	TEXX2949PG28A	0	0	0	0	0	0	1	0
Siel	PT060	1	1	0	1	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	1	0	0
Thomson	CTT5020	0	0	0	0	0	1	1	0

Option 14. PLL Tuner Control 2 High Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316T MK3	0	0	0	0	0	1	0	0
Philips	UV1316MK2	0	0	1	1	0	1	0	0
Alps	TELE9X062A	0	0	0	0	1	0	0	0
Samsung	TEXX2949PG28A	0	0	0	0	1	0	0	0
Siel	PT060	0	0	1	1	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	1
Thomson	CTT5020	1	0	0	0	0	1	0	1

Option 15. PLL Tuner VHF LOW – VHF HIGH Crossover Low Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316T MK3	0	0	1	0	0	0	0	0	
Philips	UV1316MK2	0	0	0	0	1	0	1	0	(0A hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	0	1	0	0	0	
Siel	PT060	0	0	0	0	1	0	1	0	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	1	0	1	0	1	0	1	0	(AA hex)

Option 16. PLL Tuner VHF LOW – VHF HIGH Crossover High Byte

Pll tuner VHF LOW - VHF HIGH crossover high byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316T MK3	0	0	0	0	1	1	0	0	
Philips	UV1316MK2	0	0	0	0	1	1	0	0	(0C hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	0	1	1	0	1	
Siel	PT060	0	0	0	0	1	1	0	1	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	0	0	0	0	1	0	0	1	(09 hex)

Option 17. PLL Tuner VHF HIGH – UHF Crossover Low Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316T MK3	0	0	0	0	0	0	1	0	
Philips	UV1316MK2	1	1	1	0	0	0	1	0	(E2 hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	1	0	1	0	0	0	1	0	
Siel	PT060	1	0	1	0	0	1	0	0	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	1	0	1	0	0	0	1	0	(A2 hex)

Option 18. PLL Tuner VHF HIGH – UHF Crossover High Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316T MK3	0	0	0	1	1	1	1	0	
Philips	UV1316MK2	0	0	0	1	1	1	1	0	(1D hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	1	1	1	1	0	
Siel	PT060	0	0	0	1	1	1	1	0	

Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0
Thomson	CTT5020	0	0	0	1	1	0	1	1 (1B hex)

Option 19. PIP PLL Tuner Control 1 Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316MK2	1	0	0	0	1	1	1	0
Alps	TELE9X062A	1	0	0	0	1	1	1	0
Samsung	TEXX2949PG28A	1	0	0	0	1	1	1	0
Siel	PT060	1	0	0	0	1	1	1	0
Temic	5001PH5-3X0003	1	0	0	0	1	1	1	0
Thomson	CTT5020	1	0	0	0	1	1	1	0

Option 20. PIP PLL Tuner Control 2 Low Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316MK2	1	0	1	0	0	0	0	1
Alps	TELE9X062A	0	0	0	0	0	0	0	1
Samsung	TEXX2949PG28A	0	0	0	0	0	0	0	1
Siel	PT060	0	1	1	0	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	0	1	0
Thomson	CTT5020	0	0	0	0	0	0	1	1

Option 21. PIP PLL Tuner Control 2 Mid Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316MK2	1	0	0	1	0	0	1	0
Alps	TELE9X062A	0	0	0	0	0	0	1	0
Samsung	TEXX2949PG28A	0	0	0	0	0	0	1	0
Siel	PT060	1	1	0	1	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	1	0	0
Thomson	CTT5020	0	0	0	0	0	1	1	0

Option 22. PIP PLL Tuner Control 2 High Byte

		b7	b6	b5	b4	b3	b2	b1	b0
Philips	UV1316MK2	0	0	1	1	0	1	0	0
Alps	TELE9X062A	0	0	0	0	1	0	0	0
Samsung	TEXX2949PG28A	0	0	0	0	1	0	0	0
Siel	PT060	0	0	1	1	0	0	0	0
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	1
Thomson	CTT5020	1	0	0	0	0	1	0	1

Option 23. PIP PLL Tuner VHF LOW – VHF HIGH Crossover Low Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316MK2	0	0	0	0	1	0	1	0	(0A hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	0	1	0	0	0	
Siel	PT060	0	0	0	0	1	0	1	0	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	1	0	1	0	1	0	1	0	(AA hex)

Option 24. PIP PLL Tuner VHF LOW – VHF HIGH Crossover High Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316MK2	0	0	0	0	1	1	0	0	(0C hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	0	1	1	0	1	
Siel	PT060	0	0	0	0	1	1	0	1	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	0	0	0	0	1	0	0	1	(09 hex)

Option 25. PIP PLL Tuner VHF HIGH – UHF Crossover Low Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316MK2	1	1	1	0	0	0	1	0	(E2 hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	1	0	1	0	0	0	1	0	
Siel	PT060	1	0	1	0	0	1	0	0	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	1	0	1	0	0	0	1	0	(A2 hex)

Option 26. PIP PLL Tuner VHF HIGH – UHF Crossover High Byte

		b7	b6	b5	b4	b3	b2	b1	b0	
Philips	UV1316MK2	0	0	0	1	1	1	1	0	(1D hex)
Alps	TELE9X062A	0	0	0	0	0	0	0	0	
Samsung	TEXX2949PG28A	0	0	0	1	1	1	1	0	
Siel	PT060	0	0	0	1	1	1	1	0	
Temic	5001PH5-3X0003	0	0	0	0	0	0	0	0	
Thomson	CTT5020	0	0	0	1	1	0	1	1	(1B hex)

Option 27. Language Available 1

B7: L7 = DANISH
B6: L6 = SWEDISH
B5: L5 = ITALIAN
B4: L4 = PORTUGUESE
B3: L3 = SPANISH
B2: L2 = FRENCH
B1: L1 = GERMAN
B0: L0 = ENGLISH
1: Language available
0: Language not available

Option 28. Language Available 2

B7: L15 = CROATIC
B6: L14 = POLISH
B5: L13 = SLOVAK
B4: L12 = CZECH
B3: L11 = HUNGARY
B2: L10 = GREEK
B1: L9 = TURKEY
B0: L8 = NORWEGIAN
1: Language available
0: Language not available

Option 29. Language Available 3 and Zoom Mode Available

B7: ZSP = 16:9 ZOOM SUBTITLE MODE
B6: ZSB = 16:9 ZOOM MODE
B5: ZCN = 14:9 ZOOM MODE
B4: PNM = 1 (Panaromic zoom mode)
B3: Tub = note 2
B2: Z.Def = note 3
B1: PMK = note 1
B0:

1: Available
0: Not available

note 1 :
PMK : Picture mode key
0 : Not available picture mode key from RC
1 : available picture mode key from RC

note 2:
Tub : Tube size

0 = 16:9 Tube size
1 = 4:3 Tube size

note 3:
Z.Def : Zoom Default Mode

0 = 16:9 mode default
1 = 4:3 mode default

Option 30. Country

B7: C4 = note 1
B6: C3 = note 1
B5: C2 = note 1
B4: C1 = note 1
B3: C0 = note 1
B2: x = x
B1: x = x
B0: x = x

note 1:
C5,C4,C3,C2,C1,C0 = Country

0, 0, 0,0,0	=	OTHER,	Not allowed
0, 0, 0,0,1	=	D,	Germany
0, 0, 0,1,0	=	A,	
0, 0, 0,1,1	=	CH,	
0, 0, 1,0,0	=	I,	
0, 0, 1,0,1	=	F,	
0, 0, 1,1,0	=	RSM,	
0, 0, 1,1,1	=	B,	
0, 1, 0,0,0	=	DK,	
0, 1, 0,0,1	=	S,	
0, 1, 0,1,0	=	N,	
0, 1,0,1,1	=	FIN,	
0, 1,1,0,0	=	GB,	
0, 1,1,0,1	=	IRL,	
0, 1,1,1,0	=	IS,	
0, 1,1,1,1	=	NL,	
1, 0,0,0,0	=	E,	
1, 0,0,0,1	=	P,	
1, 0,0,1,0	=	PL,	
1, 0,0,1,1	=	CZ,	
1, 0,1,0,0	=	H,	
1, 0,1,0,1	=	HR,	
1, 0,1,1,0	=	GR,	
1, 0,1,1,1	=	TR	

Option 31. Prescaler MSP FM (AVL=OFF)

	b7	b6	b5	b4	b3	b2	b1	b0
prescaler MSP FM (AVL = OFF)	0	0	0	0	1	0	0	0

	b7	b6	b5	b4	b3	b2	b1	b0	
prescaler MSP FM (AVL = OFF)	0	0	0	0	1	0	0	0	(if virtual dolby option is available)

Option 32. Prescaler MSP NICAM (AVL=OFF)

	b7	b6	b5	b4	b3	b2	b1	b0
prescaler MSP NICAM (AVL = OFF)	0	0	0	1	1	1	1	1

	b7	b6	b5	b4	b3	b2	b1	b0	
prescaler MSP NICAM (AVL = OFF)	0	0	0	1	1	1	1	1	(if virtual dolby option is available)

Option 33. Prescaler MSP SCART (AVL=OFF)

	b7	b6	b5	b4	b3	b2	b1	b0	
prescaler MSP SCART (AVL = OFF)	0	0	0	0	1	1	0	0	
prescaler MSP SCART (AVL = OFF)	0	0	0	1	1	0	0	1	(if virtual dolby option is available)

Option 34. Prescaler MSP I2S (AVL=OFF)

	b7	b6	b5	b4	b3	b2	b1	b0
prescaler MSP I2S (AVL = OFF) (if virtual dolby option is available)	not defined yet							

Option 35. Not used

B7:	x	=	note 7
B6:	x	=	note 6
B5:	x	=	note 5
B4:	x	=	note 4
B3:	AV2S	=	Scart2 SVHS
B2:	Macro	=	Macrovision
B1:	DP	=	Dolby Prologic
B0:	VD	=	Virtual Dolby

Option 36. Not used

B7:	x	=	note 7
B6:	TAT	=	1 Tilt and trapez enabled
B5:	SWF	=	1 Subwoofer enabled
B4:	VLO	=	1 Variable line out
B3:	VBUS	=	1 Vestelbus enabled
B2:	x	=	x
B1:	DVD	=	1 DVD enabled
B0:	DVB	=	1 DVB enabled

Option 37. Reserved for USA

Option 38. TV Teletext Mode Selection, Child Lock, Equalizer Country

B7:	VCR	=	note 7
B6:	C	=	note 6
B5:	LM	=	note 5
B4:	EQ	=	note 4
B3:	x	=	x
B2:	CL	=	note 2
B1:	T1	=	note 1
B0:	T0	=	note 1

note 1:
Teletext selection
T1, T0:
0,0 = No TV Text
0,1 = Simple TV Text (One page)
1,1 = Fasttext/Toptext TV Text (Eight pages)

note 2 :

CL	=	Child Lock
0	=	Off
1	=	On (Active)

note 3 :

RGB = RGB Menu Item active/inactive
0 = RGB Menu Item inactive
1 = RGB Menu Item active

note 4 :

EQ = Equalizer available
0 = Equalizer not available
1 = Equalizer available

note 5 :

LM = List Mode available
0 = List Mode not available
1 = List Mode available

note 6 :

C = Country Line available / Aps available or not
0 = Country Line not available / Aps not available
1 = Country Line available / Aps available

note 7 :

VCR = VCR Menu Item available / not available
0 = VCR Menu Item not available
1 = VCR Menu Item available

Option 39. Personal Preference Equalizer Band 1

	b7	b6	b5	b4	b3	b2	b1	b0
EQUALIZER BAND 1	0	0	0	0	0	1	1	0

Option 40. Personal Preference Equalizer Band 2

	b7	b6	b5	b4	b3	b2	b1	b0
EQUALIZER BAND 2	0	0	0	0	0	1	1	0

Option 41. Personal Preference Equalizer Band 3

	b7	b6	b5	b4	b3	b2	b1	b0
EQUALIZER BAND 3	0	0	0	0	0	1	1	0

Option 42. Personal Preference Equalizer Band 4

	b7	b6	b5	b4	b3	b2	b1	b0
EQUALIZER BAND 4	0	0	0	0	0	1	1	0

Option 43. Personal Preference Equalizer Band 5

	b7	b6	b5	b4	b3	b2	b1	b0
EQUALIZER BAND 5	0	0	0	0	0	1	1	0

Option 44. Sound Effect (Standard; Music; Speech; Jazz; Pp)

	b7	b6	b5	b4	b3	b2	b1	b0
SOUND EFFECT	0	0	0	0	0	1	1	0

Option 45. Volume Offset Left

	b7	b6	b5	b4	b3	b2	b1	b0
VOLUME OFFSET LEFT	0	0	0	0	0	1	1	0

Option 46. Volume Offset Right

	b7	b6	b5	b4	b3	b2	b1	b0
VOLUME OFFSET RIGHT	0	0	0	0	0	1	1	0

Option 47. Volume Offset Center

	b7	b6	b5	b4	b3	b2	b1	b0
VOLUME OFFSET CENTER	0	0	0	0	0	1	1	0

Option 48. Volume Offset Rear

	b7	b6	b5	b4	b3	b2	b1	b0
VOLUME OFFSET REAR	0	0	0	0	0	1	1	0

Option 49. Surround Delay

	b7	b6	b5	b4	b3	b2	b1	b0
SURROUND DELAY	0	0	0	0	0	0	0	1

Option 50. FM Prescale

	b7	b6	b5	b4	b3	b2	b1	b0
FM PRESCALE for Stereo	0	0	0	0	1	1	0	0

	b7	b6	b5	b4	b3	b2	b1	b0
FM PRESCALE for Dolby	0	0	0	0	1	0	0	1

Note: if virtual dolby is available, this option is not used.

Option 51. NICAM Prescale

	b7	b6	b5	b4	b3	b2	b1	b0
NICAM Prescale for Stereo	0	0	1	0	1	1	0	1

	b7	b6	b5	b4	b3	b2	b1	b0
3D Panorama	0	0	0	0	1	0	1	1

	b7	b6	b5	b4	b3	b2	b1	b0
NICAM Prescale for Dolby	0	0	0	0	1	1	1	0

Note: if virtual dolby is available, this option is not used.

Option 52. Scart Input Prescale

	b7	b6	b5	b4	b3	b2	b1	b0	
Scart Input Prescale for Stereo	0	0	0	0	1	0	0	0	
Scart Input Prescale for Dolby	0	0	0	0	1	1	1	1	
prescaler MSP Scart (AVL = OFF)	0	0	0	1	1	0	0	1	(if virtual dolby option is available)

Note: if virtual dolby is available, this option is not used.

Option 53. I2S Prescale

	b7	b6	b5	b4	b3	b2	b1	b0
I2S Prescale for Stereo	0	0	0	0	0	1	1	0

	b7	b6	b5	b4	b3	b2	b1	b0
I2S Prescale for Dolby	0	0	0	0	0	1	1	0

Note: if virtual dolby is available, this option is not used.

Option 54. Scart Output Prescale

	b7	b6	b5	b4	b3	b2	b1	b0
Scart Output Prescale	0	1	1	1	1	1	1	1

Option 55. Speaker Setup

	b7	b6	b5	b4	b3	b2	b1	b0
Speaker Setup (L/R, L/C/R, L/R/S, L/C/R/S)	0	0	0	0	0	0	0	0

Option 56. Audio Options Available Or Not

Attention: All bits on the Option 56 must be the “0” for MONO TV SETS

B7: nicam = note 7
B6: ASD = note 6
B5: VRS = note 5
B4: CRM = note 4
B3: … = x
B2: LBE = note 2
B1: Spa = note 1
B0: Avl = note 0

note 7 :
nicam = nicam available
0 = nicam not available
1 = nicam available

note 6 :
ASD = Auto Sound Detection available/not available
0 = Auto Sound Detection not available
1 = Auto Sound Detection available

note 5 :
VRS = Virtual Surround
0 = VRS not available
1 = VRS available

note 4 :
CRM = CARRIER MUTE OFF/ON
0 = Sound carrier mute is ON in the Stereo Sound IC
1 = Sound carrier mute is OFF in the Stereo Sound IC (i.e. option available)

note 2 :
LBE = LBE (Dynamic Bass)
0 = LBE not available
1 = LBE available

note 1 :
Spa = Spatial Efect available
0 = Spatial Efect not available
1 = Spatial Efect available

note 0 :
Avl = Automatic volume level available on the Menu
0 = Automatic volume level not available
1 = Automatic volume level available

Option 57. Stereo Threshold

B7: b7 = note 1 Remark :
B6: b6 = note 1
B5: b5 = note 1 -Threshold for all FM A2 signals to switch from MONO to STEREO.
B4: b4 = note 1 -For first check after programme change half value is changed (0Ch) 19h/2
B3: b3 = note 1 -For switching from STEREO back to MONO: 19h/4 *3
B2: b2 = note 1
B1: b1 = note 1
B0: b0 = note 1

note 1 :

	b7	b6	b5	b4	b3	b2	b1	b0
MSP Stereo/Mono Threshold	0	0	0	1	1	0	0	1

Option 58. MSP Audio Flags

B7: b7 = x
B6: b6 = x
B5: b5 = x
B4: Trs = note 1
B3: Trb = note 1
B2: Bbe = note 1
B1: Spa = note 1
B0: Avl = note 1

note 1 :

Defines whether the feature is toggled ON or OFF in the menu and stored.
0 : OFF
1 : ON

Option 59. NICAM Threshold

	b7	b6	b5	b4	b3	b2	b1	b0
MSP NICAM Threshold	0	1	1	0	0	1	0	0

Option 60. Power Delay Time

B7: NZ = x
B6: HM = x
B5: L5 = note 3
B4: L4 = note 3
B3: L3 = note 3
B2: L2 = note 3
B1: L1 = note 3
B0: L0 = note 3

note 3:

	L7	L6	L5	L4	L3	L2	L1	L0
Default Value :	x	x	1	1	0	0	0	0

1000 MSEC = 1SN

Number	L7L6L5L4L3L2L1L0		Delay	
0	00000000	=	4	sec
1	00000001	=	4,25	sec
2	00000010	=	4,5	sec
3	00000011	=	4,75	sec
4	00000100	=	5	Sec
5	00000101	=	5,25	Sec
6	00000110	=	5,5	Sec
7	00000111	=	5,75	Sec
8	00001000	=	6	sec
9	00001001	=	6,25	sec
10	00001010	=	6,5	sec
11	00001011	=	6,75	sec
12	00001100	=	7	sec
13	00001101	=	7,25	sec
14	00001110	=	7,5	sec
15	00001111	=	7,75	sec
16	00010000	=	8	sec
17	00010001	=	8,25	sec
18	00010010	=	8,5	sec
19	00010011	=	8,75	sec

Number	L7L6L5L4L3L2L1L0		Delay	
32	00100000	=	12	sec
33	00100001	=	12,25	sec
34	00100010	=	12,5	sec
35	00100011	=	12,75	sec
36	00100100	=	13	sec
37	00100101	=	13,25	sec
38	00100110	=	13,5	sec
39	00100111	=	13,75	sec
40	00101000	=	14	sec
41	00101001	=	14,25	sec
42	00101010	=	14,5	sec
43	00101011	=	14,75	sec
44	00101100	=	15	sec
45	00101101	=	15,25	sec
46	00101110	=	15,5	sec
47	00101111	=	15,75	sec
48	00110000	=	16	sec
49	00110001	=	16,25	sec
50	00110010	=	16,5	sec
51	00110011	=	16,75	sec

20	00010100	=	9	sec
21	00010101	=	9,25	sec
22	00010110	=	9,5	sec
23	00010111	=	9,75	sec
24	00011000	=	10	sec
25	00011001	=	10,25	sec
26	00011010	=	10,5	sec
27	00011011	=	10,75	sec
28	00011100	=	12	sec
29	00011101	=	12,25	sec
30	00011110	=	12,5	sec
31	00011111	=	12,75	sec

52	00110100	=	17	sec
53	00110101	=	17,25	sec
54	00110110	=	17,5	sec
55	00110111	=	17,75	sec
56	00111000	=	18	sec
57	00111001	=	18,25	sec
58	00111010	=	18,5	sec
59	00111011	=	18,75	sec
60	00111100	=	19	sec
61	00111101	=	19,25	sec
62	00111110	=	19,5	sec
63	00111111	=	19,75	sec

	76543210
0	00000000
1	00000001
2	00000010
3	00000011
4	00000100
5	00000101
6	00000110
7	00000111
8	00001000
9	00001001
10	00001010
11	00001011
12	00001100
13	00001101
14	00001110
15	00001111
16	00010000
17	00010001
18	00010010
19	00010011
20	00010100
21	00010101
22	00010110
23	00010111
24	00011000
25	00011001
26	00011010
27	00011011
28	00011100
29	00011101
30	00011110
31	00011111

Bit Positions

Colour Code

	76543210
32	00100000
33	00100001
34	00100010
35	00100011
36	00100100
37	00100101
38	00100110
39	00100111
40	00101000
41	00101001
42	00101010
43	00101011
44	00101100
45	00101101
46	00101110
47	00101111
48	00110000
49	00110001
50	00110010
51	00110011
52	00110100
53	00110101
54	00110110
55	00110111
56	00111000
57	00111001
58	00111010
59	00111011
60	00111100
61	00111101
62	00111110
63	00111111

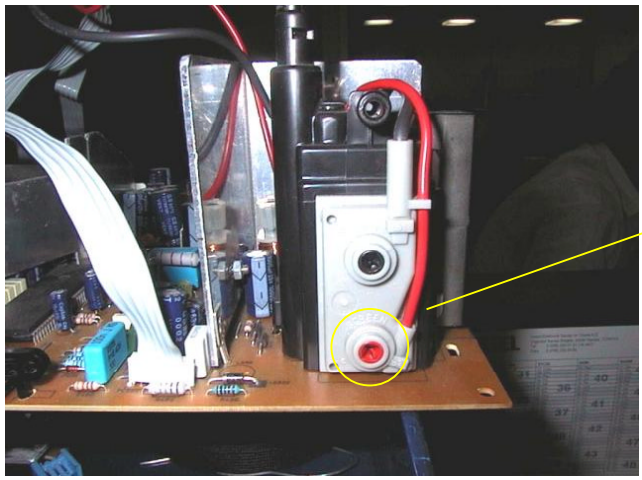
14.4.OPTION TABLE RECOMMENDED VALUES

X listed in the option can be 0 or 1

OPTION	2835 MULTI	2835W MULTI	2835W PAL I
000	X2 XXXXXX10	X2 XXXXXX10	X2 XXXXXX10
001	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
002	23 001XXX11	23 001XXX11	23 001XXX11
003	XX XXXXXXX0	XX XXXXXXX0	XX XXXXXXX0
004	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
005	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
006	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
007	XX XX0XXX1X	XX XX0XXX1X	XX XX0XXX1X
008	A1 11000001	01 00000001	01 00000001
009	0B 00001111	0B 00001111	04 00001111
010	X2 XXXXX011	X7 XXXXX111	X7 XXXXX111
011	8E 10001110	8E 10001110	8E 10001110
012	03 00000011	03 00000011	03 00000011
013	06 00000110	06 00000110	06 00000110
014	15 10000101	15 10000101	15 10000101
015	AA 10101010	AA 10101010	AA 10101010
016	09 00001001	09 00001001	09 00001001
017	A2 10100010	A2 10100010	A2 10100010
018	1B 00011011	1B 00011011	1B 00011011
019	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
020	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
021	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
022	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
023	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
024	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
025	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
026	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
027	FF 11111111	FF 11111111	FF 11111111
028	FF 11111111	FF 11111111	FF 11111111
029	FF 11111111	EF 11101111	EF 11101111
030	XX XXXXXXX	XX XXXXXXX	XX XXXXXXX
031	0F 00001111	0F 00001111	0F 00001111
032	23 00100011	23 00100011	23 00100011
033	0E 00001110	0E 00001110	0E 00001110
034	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
035	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
036	X4 XXXXX1XX	X4 XXXXX1XX	X4 XXXXX1XX
037	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
038	AF 11001111	AF 11001111	AF 11001111
039	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
040	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
041	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
042	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
043	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
044	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
045	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
046	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
047	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
048	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
049	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
050	XX XXXXXXXX	XX XXXXXXXX	XX XXXXXXXX
051	41 01000001	41 01000001	41 01000001
052	1B 00011011	1B 00011011	1B 00011011
053	06 00000110	06 00000110	06 00000110

054	75 01110101	75 01110101	75 01110101
055	00 00000000	00 00000000	00 00000000
056	DE 11011110	DE 11011110	DE 11011110
057	19 00011001	19 00011001	19 00011001
058	00 00000000	00 00000000	00 00000000
059	64 01100100	64 01100100	64 01100100
060	10 00010000	10 00010000	10 00010000

14.5.SCREEN ADJUSTMENT (FBT SCREEN)

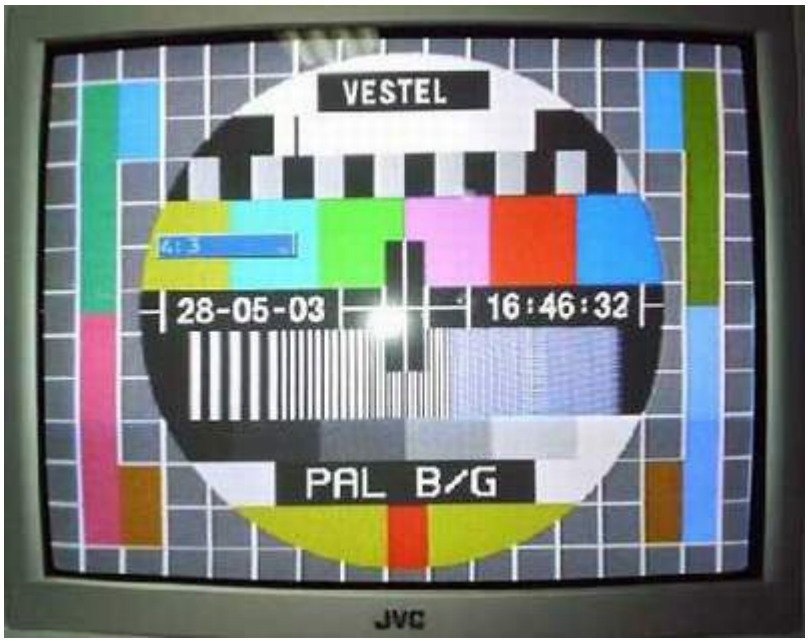


From the option list change option 2 bit 6 from 0 to 1 for disabling vertical scan. Adjust horizontal line via screen adjust pot. as thin as possible. Then press 0 to leave service menu.

14.6.GEOMETRY ADJUSTMENT

4:3 FORMATS

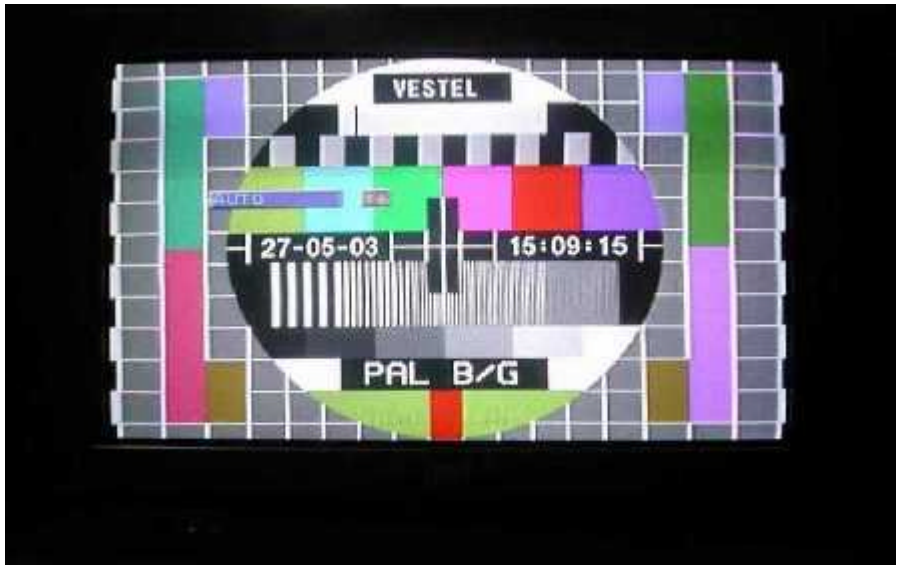
4:3 MODE

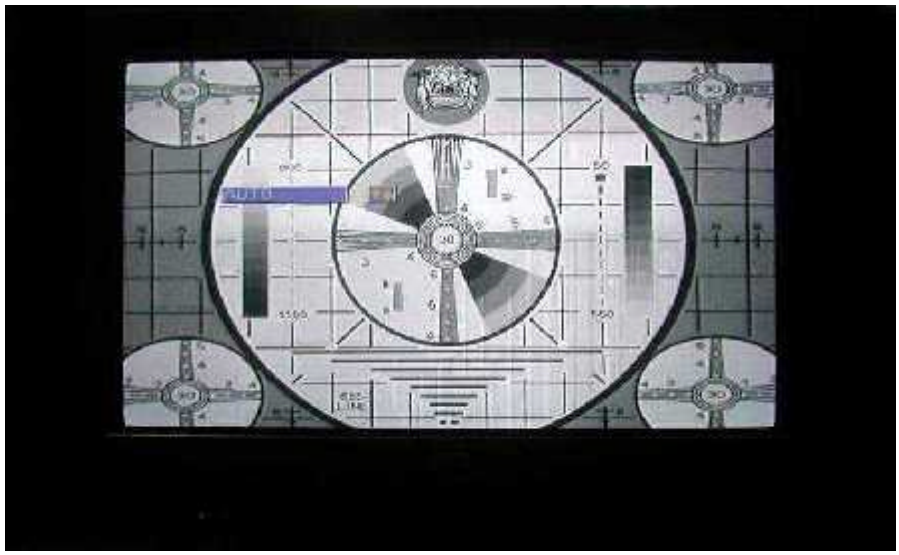


16:9 MODE

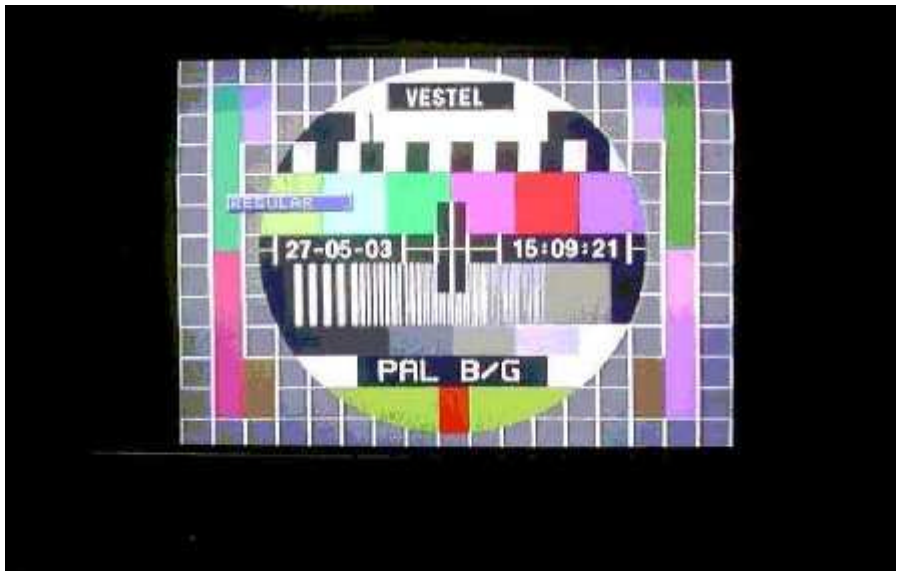
16:9 FORMATS

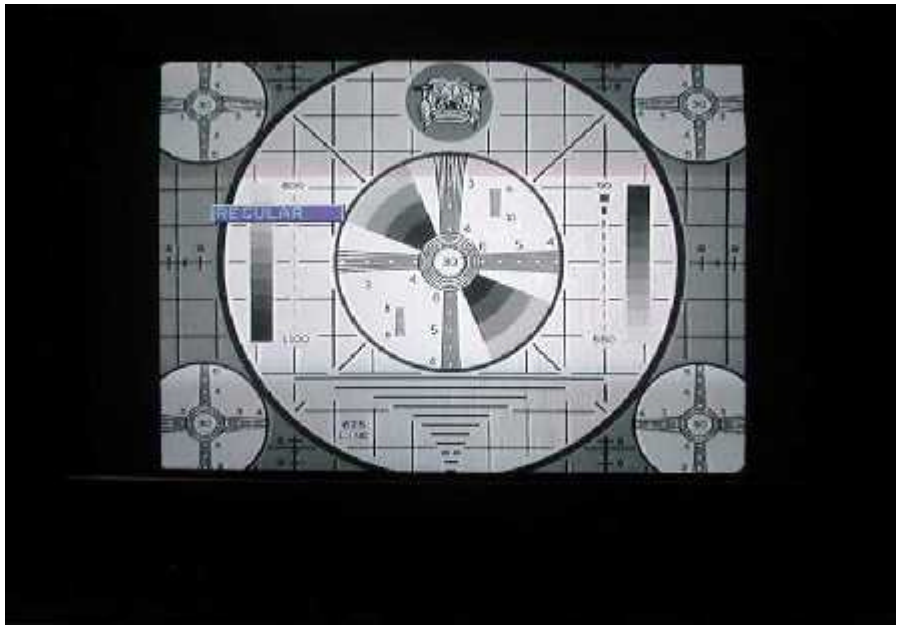
AUTO MODE



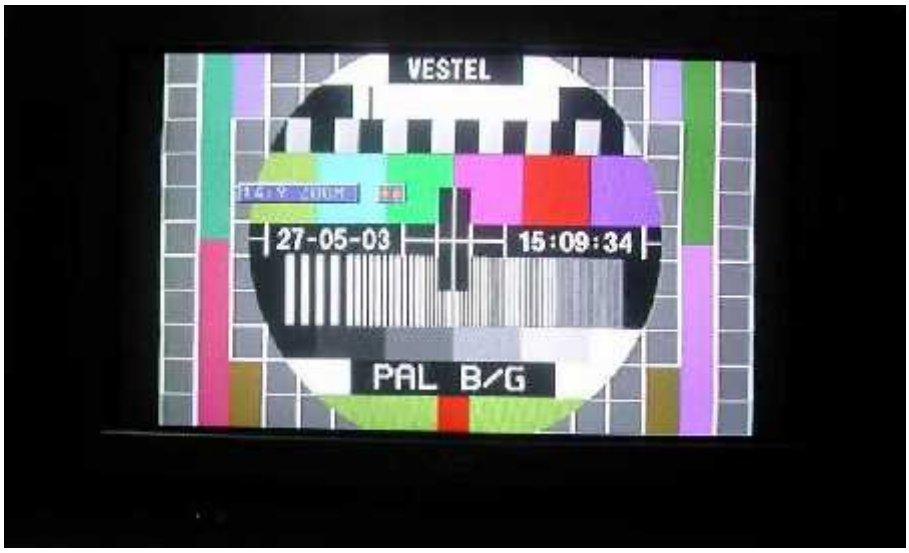


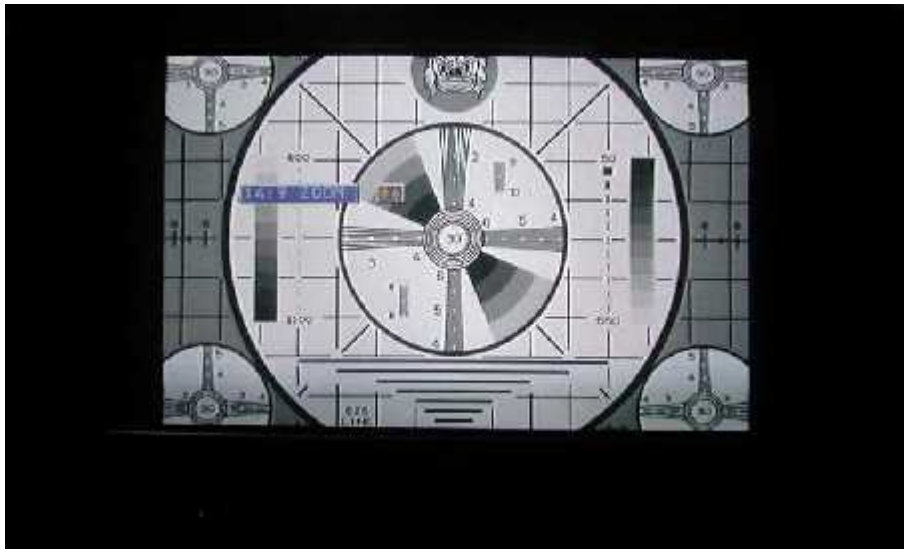
REGULAR MODE



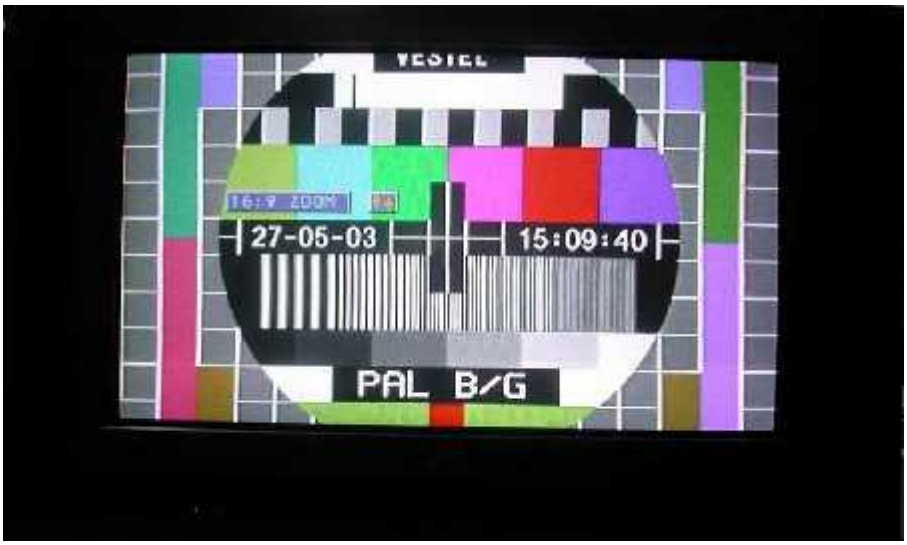


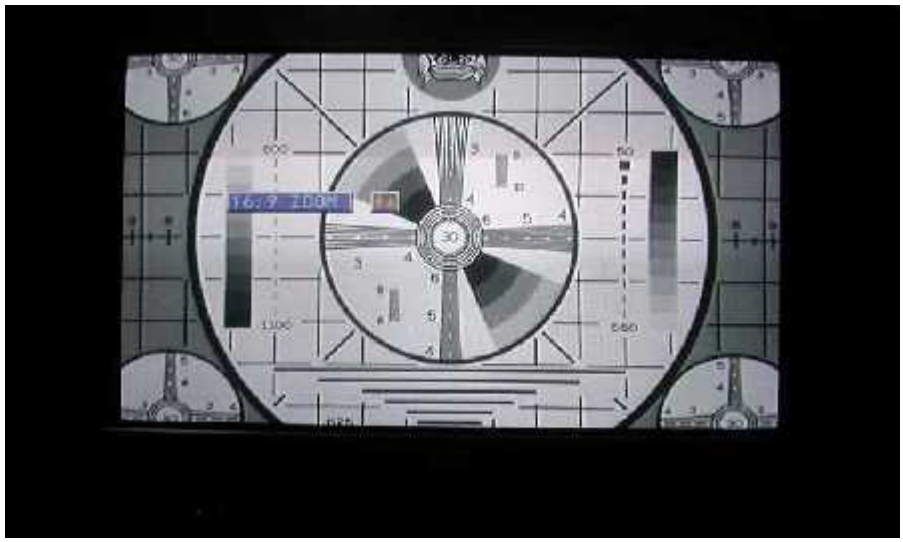
ZOOM 14:9 MODE



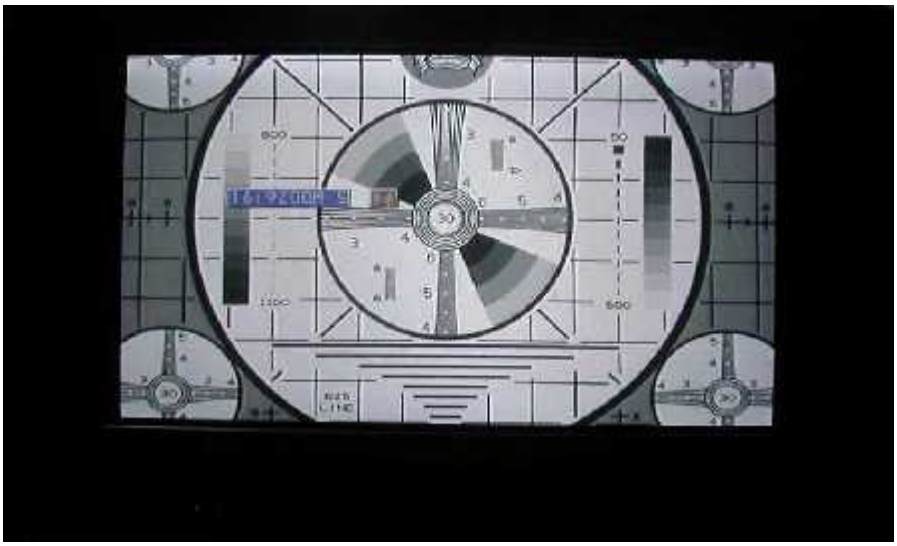


ZOOM 16:9 MODE

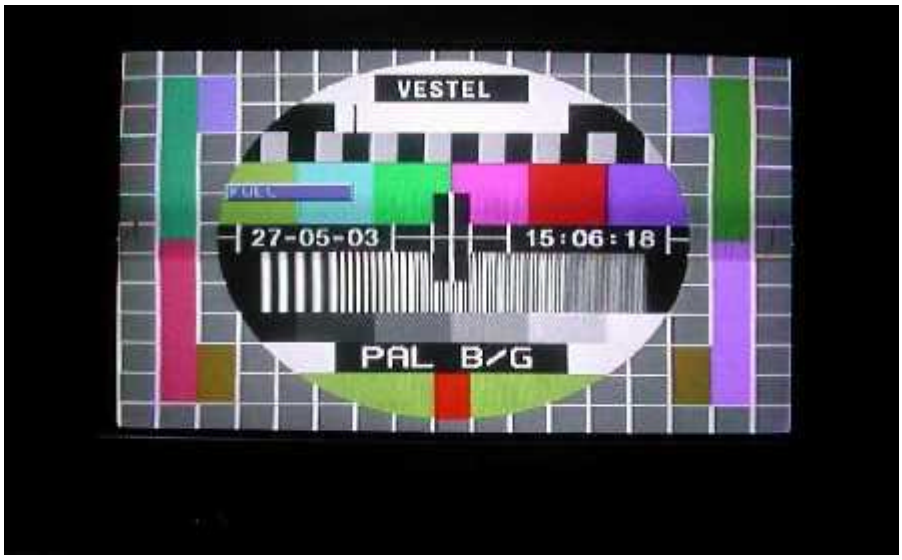


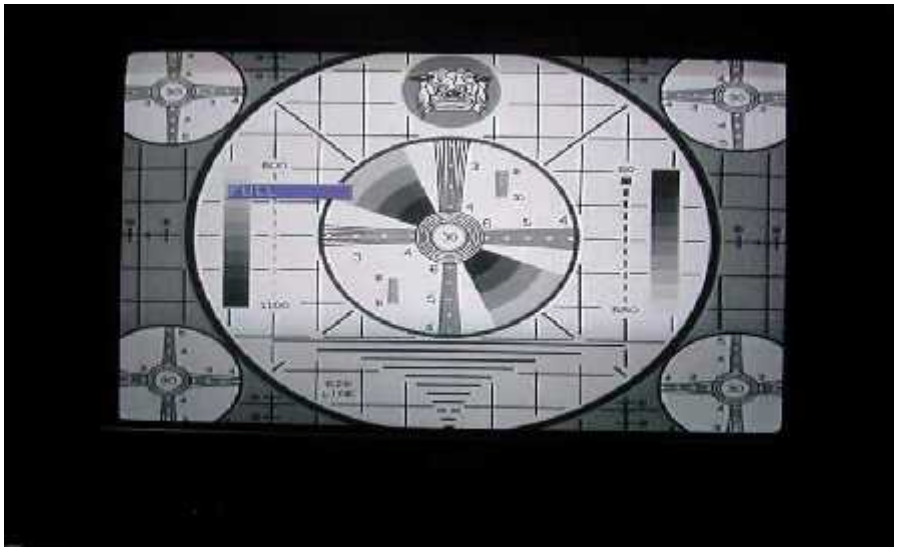


SUBTITLE ZOOM MODE

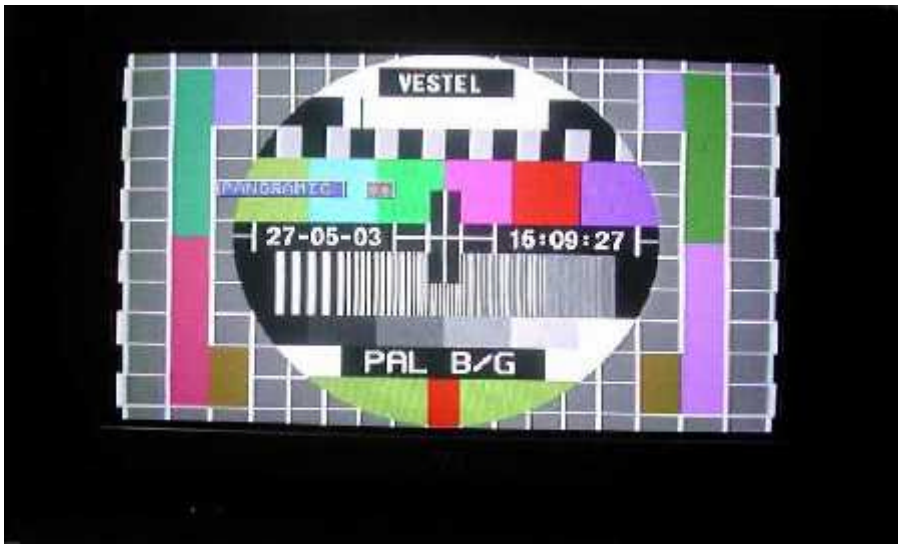


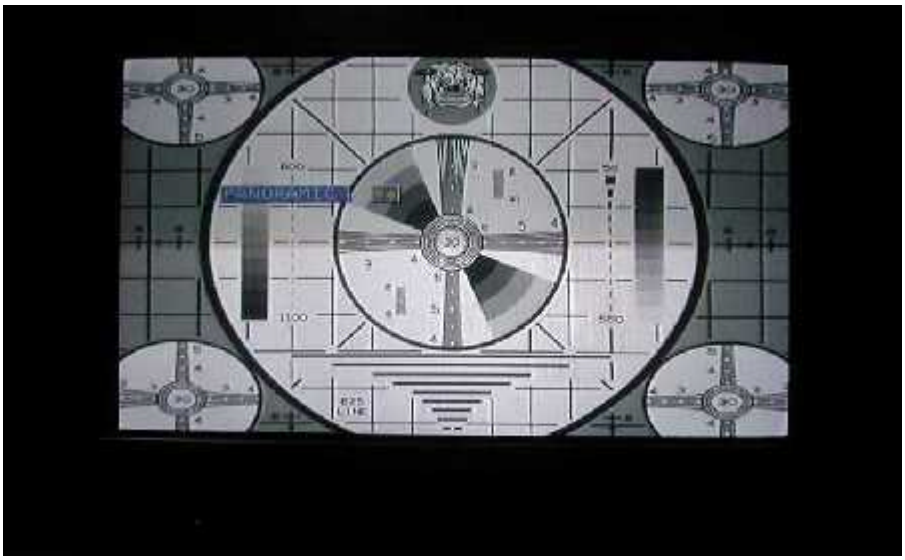
FULL MODE



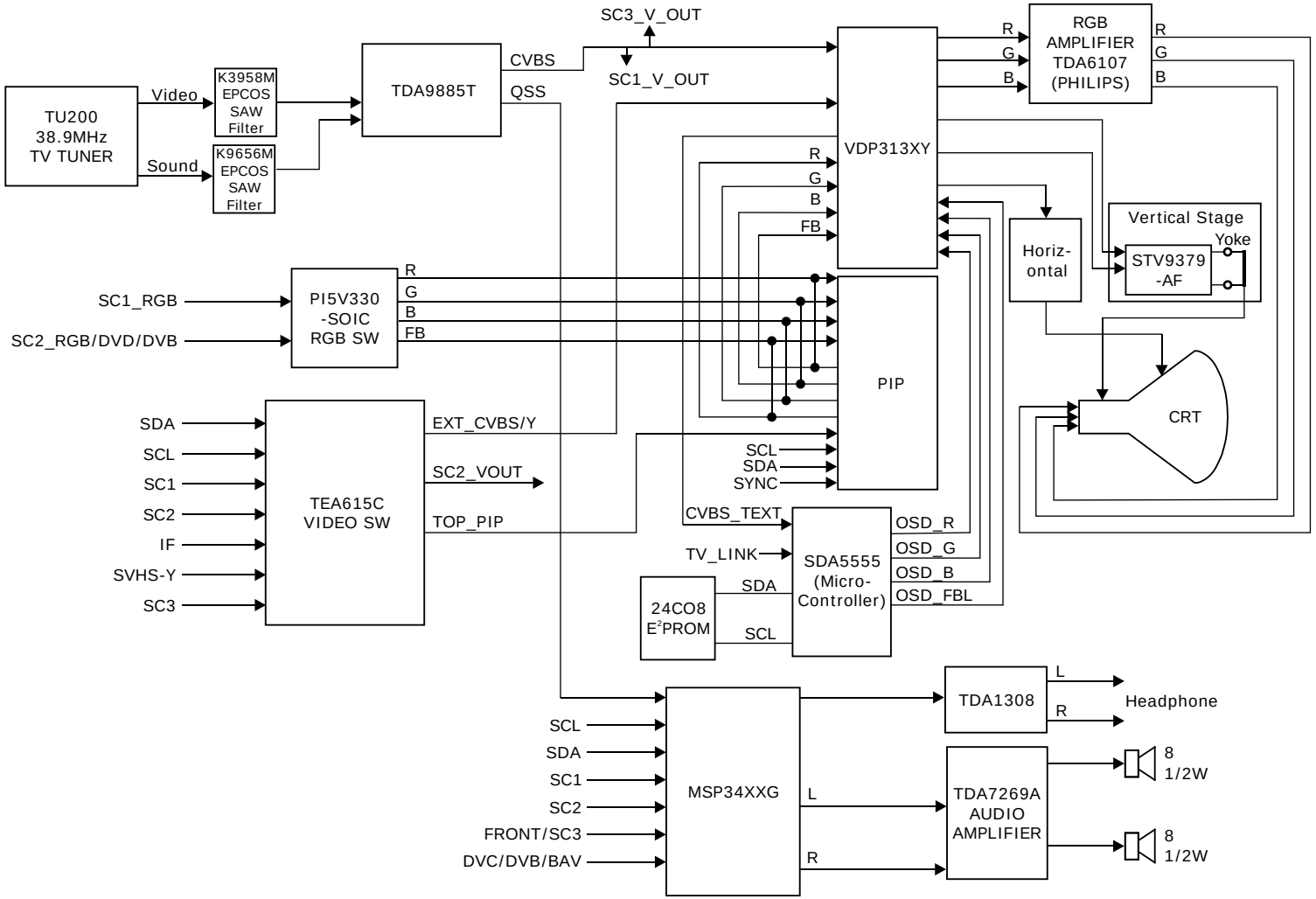


PANOROMIC MODE

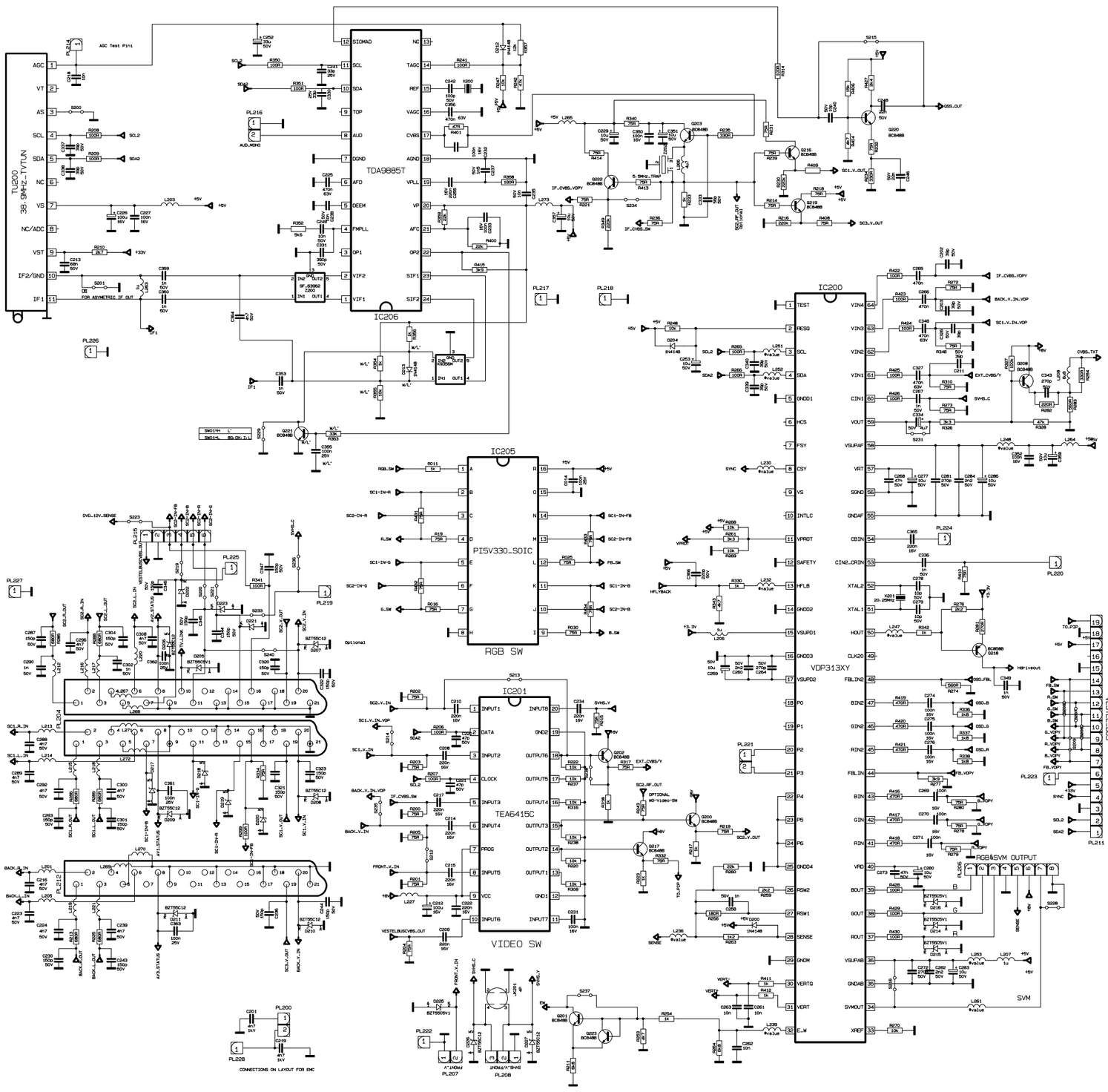


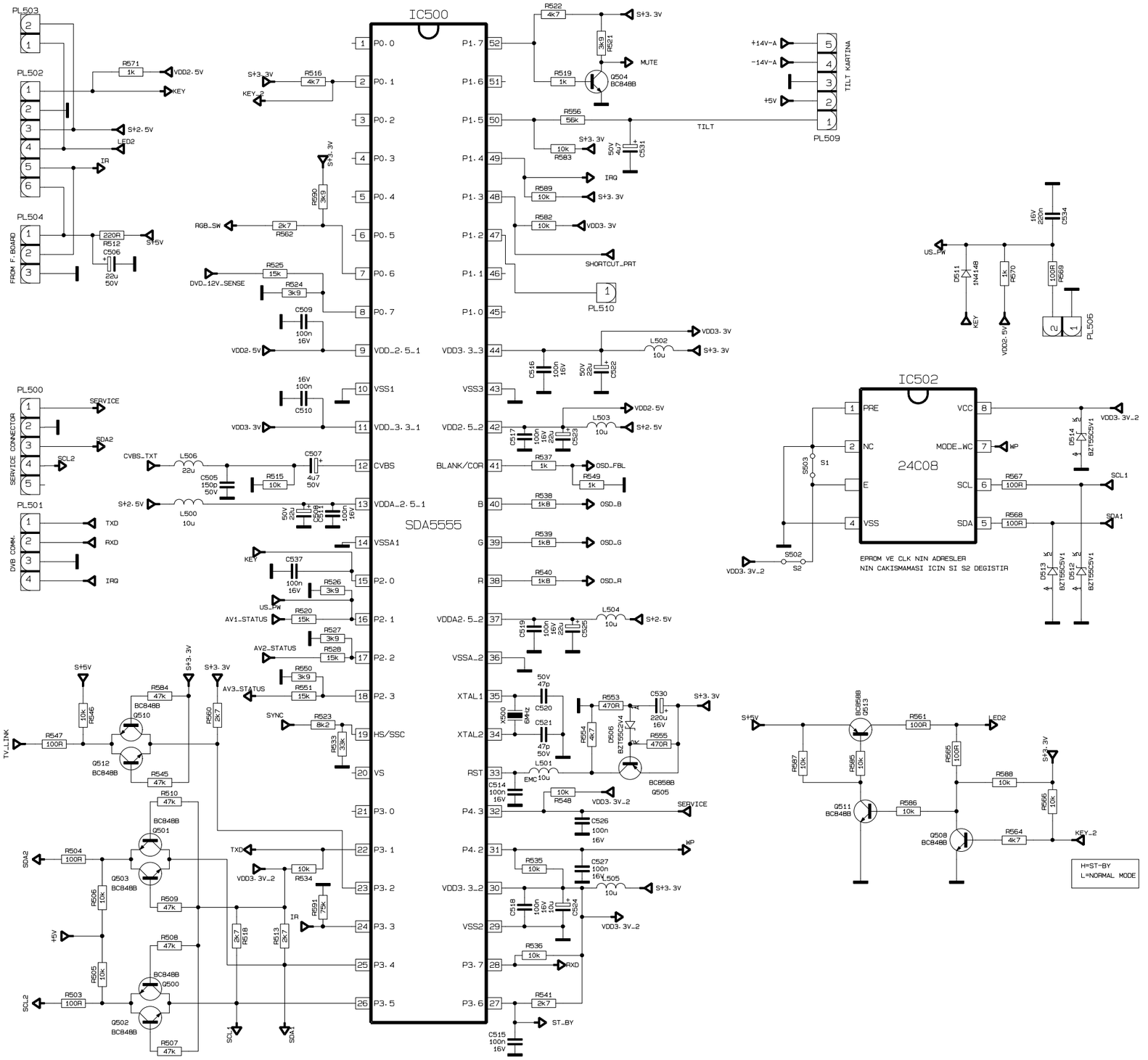


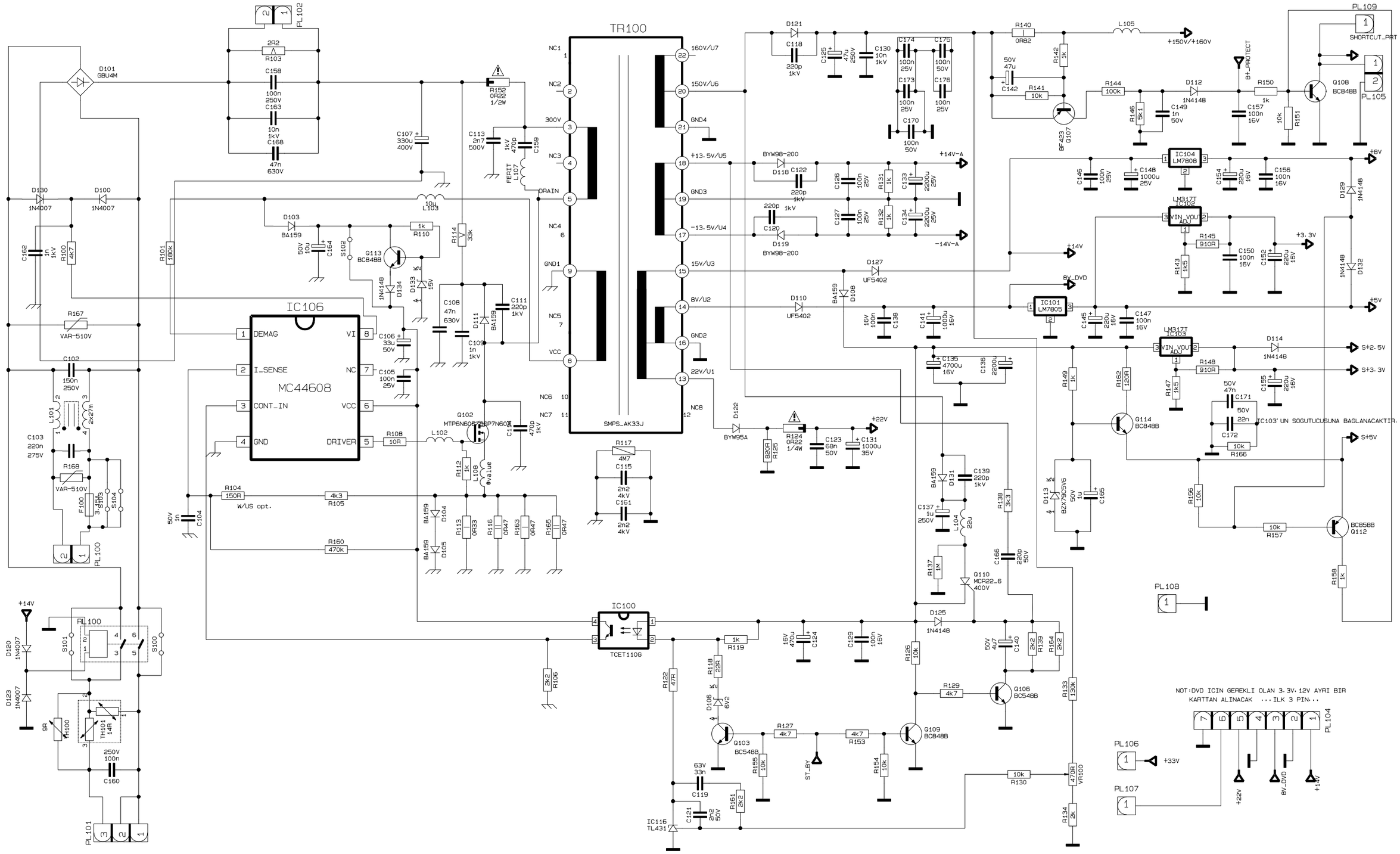
16.BLOCK DIAGRAM



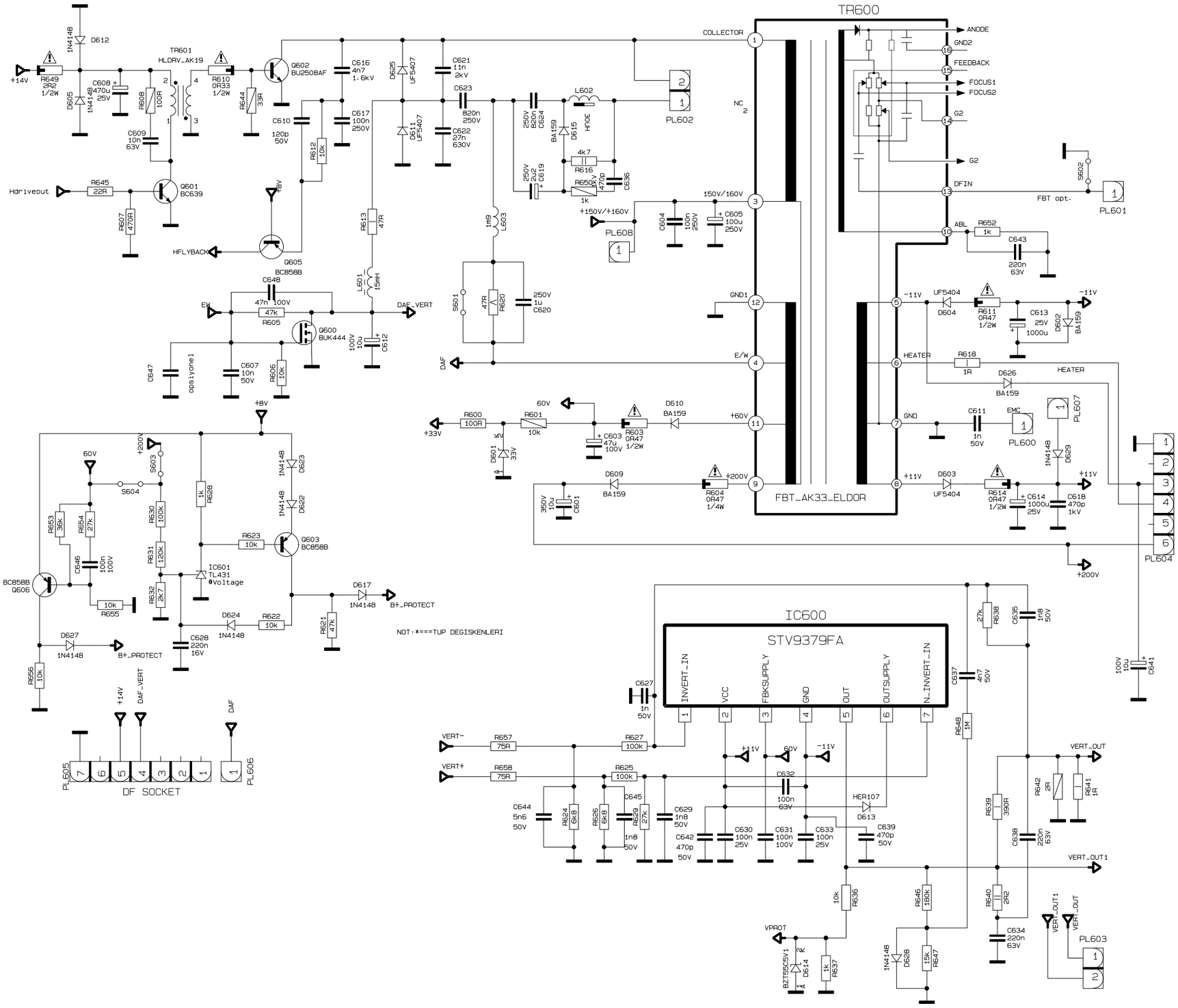
17.CIRCUIT DIAGRAMS



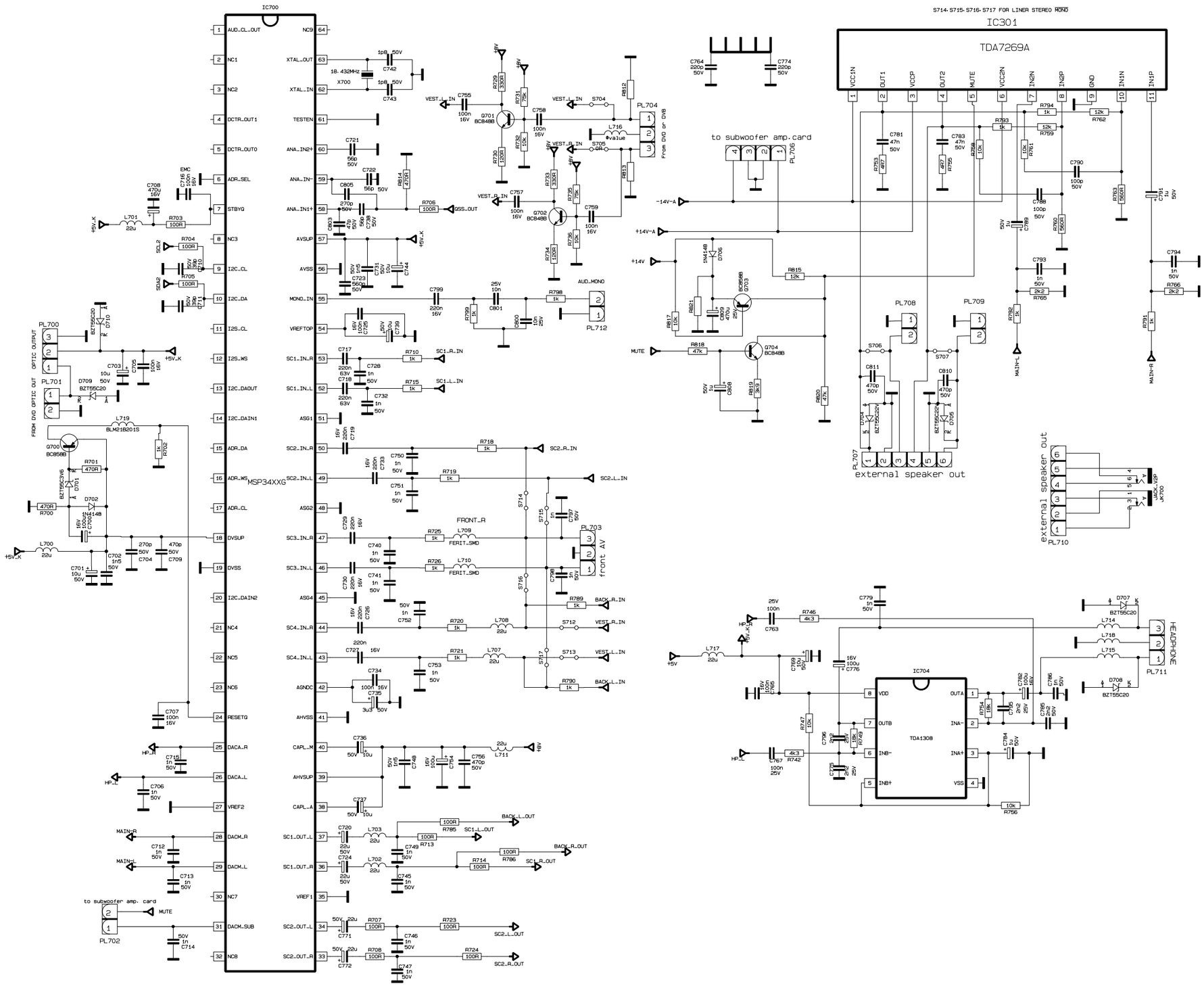

IC500
SDA5555
P0.0
P0.1
P0.2
P0.3
P0.4
P0.5
P0.6
P0.7
VDD_2.5_1
VSS1
VDD_3.3_1
CVBS
VDDA_2.5_1
VSSA1
P2.0
P2.1
P2.2
P2.3
HS/SSC
VS
P3.0
P3.1
P3.2
P3.3
P3.4
P3.5
P1.7
P1.6
P1.5
P1.4
P1.3
P1.2
P1.1
P1.0
VDD3.3_3
VSS3
VDD2.5_2
BLANK/COR
B
G
R
VDDA2.5_2
VSSA_2
XTAL1
XTAL2
RST
P4.3
P4.2
VDD3.3_2
VSS2
P3.7
P3.6
PL503
PL502
PL504
PL500
PL501
PL509
PL510
PL506
IC502
24C08
EPROM VE CLK NIN ADRESLER
NIN CAKISMAMASI ICIN SI S2 DEGISTIR
H=ST-BY
L=NORMAL MODE
MUTE
TILT
IRQ
SHORTCUT_PAT
SERVICE
WP
TXD
RXD
ST_BY
KEY
KEY_2
IR
LED2
SCL1
SDA1
SCL2
SDA2
TV_LINK
RGB_SW
DVD_12V_SENSE
AV1_STATUS
AV2_STATUS
AV3_STATUS
SYNC
US_PW
S+3.3V
S+5V
S+2.5V
VDD3.3V
VDD2.5V
VDD3.3V_2
+14V-A
-14V-A
+5V
TILT KARTINA
FROM F-BOARD
SERVICE CONNECTOR
DVB COMM.

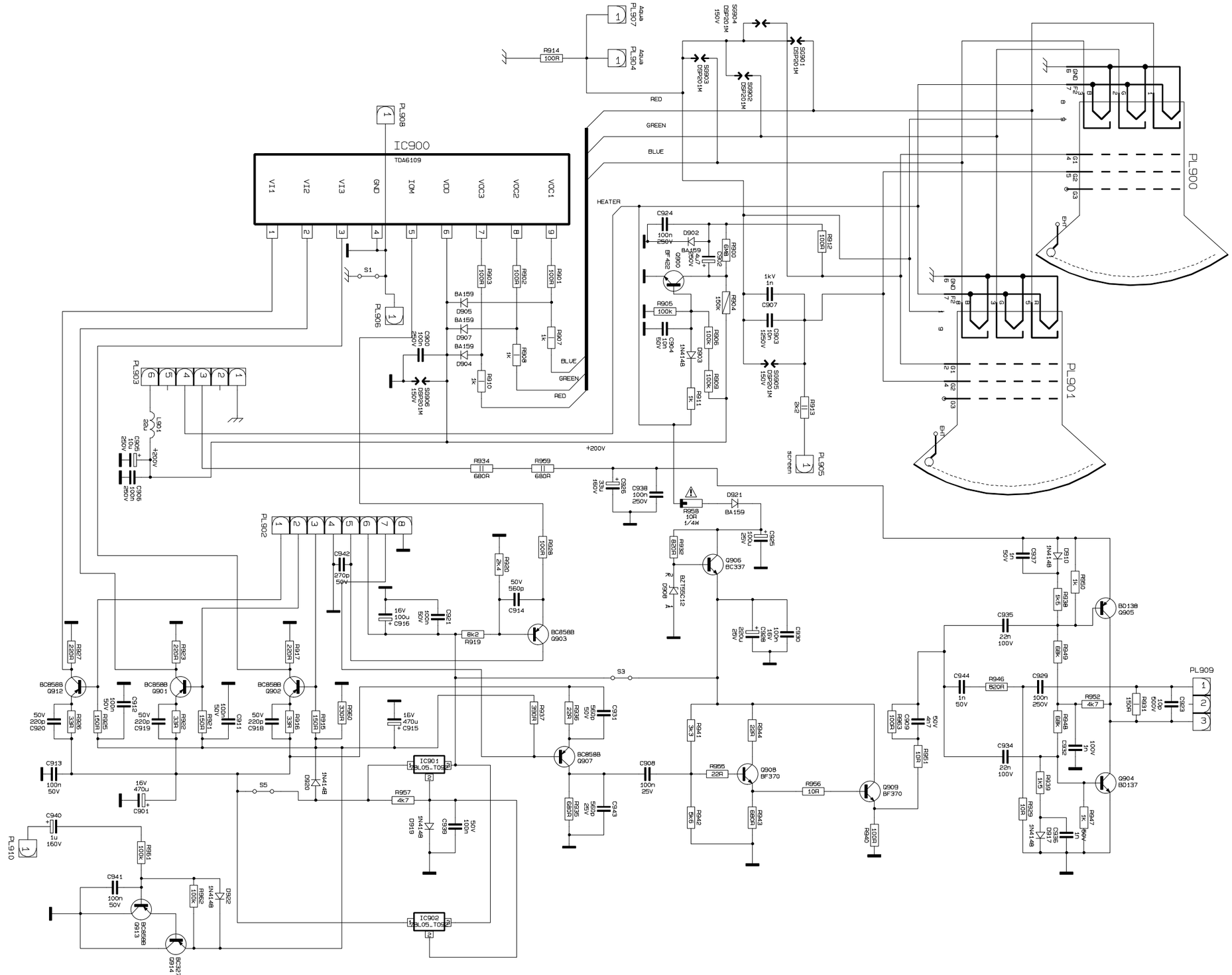


No. 0113	SWITCH-MODE POWER SUPPLY	HITACHI



No. 0113	DEFLECTION	HITACHI


IC700
MSP34XXG
IC301
TDA7269A
S714-S715-S716-S717 FOR LINER STEREO MONO
to subwoofer amp. card
PL706
external speaker out
PL710
front AV
PL711
PL712
PL703
PL704
From DVD or DVB
PL708
PL709
PL707
PL700
OPTIC OUTPUT
PL701
FROM DVD OPTIC OUT
PL702
MUTE
IC704
TDA1308
MAIN-L
MAIN-R
HEADPHONE
FRONT_R
BACK_L_IN
BACK_R_IN
VEST_L_IN
VEST_R_IN
SC1_L_IN
SC1_R_IN
SC2_L_IN
SC2_R_IN
SC1_L_OUT
SC1_R_OUT
SC2_L_OUT
SC2_R_OUT
AUD_MONO
QSS_OUT



No. 0113	CRT Circuit	HITACHI

THE UPDATED PARTS LIST

FOR THIS MODEL IS

AVAILABLE ON ESTA

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